

AGROTERRORISM - A THREAT TO THE AGRICULTURAL SECTOR

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Abstract: *The paper presents the problem of the threat of agroterrorist attacks. The author describes some historical facts regarding the use of biological agents against domestic animals and crops in military conflicts and terrorist attacks. He shows the main entities which can initiate attacks on the agricultural sector. In the final part of publication, the author presents the consequences of attacks on the agricultural sector in the case of countries that are the main targets of such attacks.*

Keywords: terrorism, weapon of mass destruction, agroterrorism, biological pathogens

1. Introduction

In the last decade, the United States and the countries of Western Europe have undertaken many projects aimed at increasing their capabilities in detecting, protecting, and responding to threat, as well as cases of terrorist attacks. Various procedures, aimed at increasing security of a given country with regards to eliminating potential terrorist attacks, were introduced. Unfortunately, there are social activities that remain outside the protection of specialized agencies and of the organizations combating terrorism.

Not many people realize the level of danger that terrorist attacks can have on one of the vulnerable branches of the economy - agriculture. Not enough attention is devoted to its security, which is why it is necessary to lead a discussion on the threat to the agricultural sector and the food industry.

Leading an attack on the agricultural sector is defined as agroterrorism. It is a type of terrorism, and more precisely of bioterrorism, which can be defined as an intentional release of animal or plant pathogens in order to induce fear, cause

economic losses, and destabilize a state.

2. Using Biological Agents in Military Conflicts

Cases of attacks on the agricultural sector took place as early as the beginning of the twentieth century. During World War I, German scientists and strategists considered the possibility of using biological agents against infantry. These proposals were rejected by the German government on moral grounds. Restricting the usage of these agents against people did not confine their usage against animals and crops. In 1915, Dr. Anton Dilger, an American of German origin, propagated, at his home in Washington, strains of *Bacillus anthracis* (anthrax) and *Pseudomonas mallei* (glanders) received from the German government. Microbial cultures were distributed to shipyard workers in Baltimore, who were sympathizing with the Germans and were meant to infect around 3-4,5 thousand packs of horses, mules, and cattle transported into Europe to aid the Allies [1]. Even the Germans during World War I did not stay clear of biological attacks. German intelligence possessed evidence that French

agents, operating in Switzerland, were infecting horses transported into Germany [2-3].

During World War II, some countries, including Japan, Germany, Canada, Great Britain, and the United States, began to work on an acquisition and utilization of a biological weapons program [4]. These plans also took into account the agricultural sector. In February 1942, the National Academy of Sciences submitted to the Secretary of War - Henry Stimson, a report describing the threats to harvest, livestock, and humans posed by biological warfare agents. Following the report, President Roosevelt ordered the conduct of both an offensive, as well as a defensive biological weapons development program. In 1943, a center for research on biological weapons was created at Fort Detrick, Maryland.

Research was conducted on:

- agents causing animal paralysis: rinderpest (cattle plague), foot-and-mouth disease, Newcastle disease (avian influenza);
- agents causing plant crops paralysis: rice blast, wheat rust, South American rust of rubber leaves, late blight and *sclerotium rot*.

At the same time, work on biological weapons was led by Great Britain. In 1942-43, research was carried out on *Bacillus anthracis* (anthrax) bacteria on Gruinard Island, off the coast of Scotland. A significant area of the island was infected by anthrax spores, which led to an ecological disaster, and caused the island to be taken out of use for approximately 40 years. Only in the 80s, a disinfectant was discovered that enabled the destruction of lingering anthrax spores. The island was probably the source of two anthrax epidemics among cattle in Great Britain.

During the war in China and Manchuria, Japanese troops (Unit 731 under the command of General Shiro Ishi) repeatedly used biological weapons not only against the population, but also against crops and livestock.

After the end of World War II, during the Cold War period, a biological weapons development program was promoted, especially by the Great Powers. The use of weapons of mass destruction against animals and agricultural crops was common during the Korean and Vietnam Wars.

In the 50s, American planners developing a concept of possible usage of biological weapons directed against enemy crops, concluded that pathogens, which slowly spread through the soil (such as most viruses, bacteria, or mycoplasma), are useless for the purpose of effectively attacking arable or domesticated plants. In the development of this type of weapon, an emphasis was placed then on the agents that could cause an epidemic in a time frame of one growing season while being airborne (could be sprayed from airplanes in a form of aerosol).

An example of preparation for war using biological agents, by destroying agricultural crops, dates back precisely to the Cold War. It was disclosed that Americans, among other nations, had prepared a 20 ton (40.000 lbs.) reserve of *Puccinia graminis tritici* fungus spores causing cereal rust, intended for the destruction of wheat crops mainly in Ukraine; however, according to experts, the reserve would be sufficient to destroy wheat crops around the globe. A stock of 1 ton (2200 lbs.) of spores of another fungus - *Pyricularia oryzae* was also prepared for the purpose of striking rice crops in China. Similarly, in 1945, Americans considered the possibility of destruction of rice crops in Japan. They withdrew from the plan, only because they would need to feed around 100 million of hungry people after Japan's defeat. As a result, they chose a nuclear strike option.

In 1972, the Biological Weapons Convention (BWC) was signed. Currently, there are 143 signatory states that have signed and ratified it; however, that did not stop the research on biological weapons. A known incident is the release of *Bacillus anthracis* from the factory in Sverdlovsk, which resulted in 66 human deaths.

3. Using Biological Agents against the Agricultural Sector by Terrorists

There are known cases of weapons of mass destruction being used against the agricultural sector in terrorist attacks. According to the Monterey Institute of International Studies, 19 cases of agroterrorism took place between 1915-2000, five of which were in the United States [5].

Examples of such cases are:

- in 1978, the Arab Revolutionary Council led to the poisoning of a transport of oranges from Jaffa, in an attempt to weaken the economy of Israel [6].
- in 1984, in the small town of Dalles, Oregon, a group of followers of Bhagwan Shree Rajneesh poisoned the local water reservoir and infected salad bars in restaurants with *Salmonella* bacteria, hoping to “stupefy” the local population and to tip the scales of important local elections in favor of the sect [7-9].
- in 1982-84, the Soviet Union used the germs of glanders against the mujahideen. As a result of the attacks, horses, the main means of transport of the Afghans, were paralyzed [10-11].
- in 1983-87, Tamils used biological agents against the Sinhalese, including, among others, agents for the destruction of tea plantations in Sri Lanka [12-14].
- in 1997, Israeli settlers from the Gaza Strip used chemicals to destroy the Palestinian grape crops. As a result of the attack, around 17.000 tons (34 million lbs.) of grapes were destroyed [15].
- in 2000, a foot-and-mouth epidemic occurred in pigs in Great Britain. To date, there is no clear evidence; however, as reported by the experts from the Czech Republic, that this could have been a terrorist attack linked to Osama bin Laden. Some have linked the epidemic to retaliation for the missile attacks of American and British forces on Iraqi facilities.

These are just some of the agroterrorist

attacks that represent spectacular examples of this poorly protected area of the economy - agriculture. An attack on the agricultural sector can be initiated by:

- countries acting on military, political, ideological, or economic motives;
- an agricultural corporation linking producers, processors, and suppliers of agricultural products, who count on the benefits of a successful biological attack resulting in financial and market consequences;
- organized crime; because of the localization of the drug industry within cultivation of crops, the agricultural sector poses high stakes for criminals;
- terrorist organizations, striving to strike the opposing states and nations;
- other individuals (madmen, people frustrated by certain activities).

Carrying out an attack on the agricultural sector is relatively simple, because this type of attack is characterized by some specific features:

- these factors do not pose a threat to the perpetrators (with an exception of a few agents, which cause zoonosis);
- technical difficulties with converting these factors into offensive tools is marginal;
- numerous potential attack targets are poorly protected (many poorly guarded facilities exist, where the release of animal or plant pathogens could potentially occur);
- moral barriers are easier to overcome (the response to a biological attack against crops or livestock would be less decisive than to an attack that causes immediate loss of human life, while the probability of finding the perpetrators of a biological attack and retaliation against them is less likely);
- maximizing the impact does not require multiple initialization sources (if intended to produce distortions in international trade by introducing a highly contagious disease);

- a single point source is enough to create an impression that the illnesses were caused by natural factors;
- it is also easy, without the need to cross borders, to achieve multiple outbreaks through the contamination of imported fodders and fertilizers.

The agricultural sector is especially vulnerable to terrorist attacks. Key vulnerabilities stem from [16]:

Concentrated and intensive contemporary farming practices. Highly crowded breeding and rearing conditions mean that an outbreak of a contagious disease would be very difficult to contain, especially if it is airborne, and could require the destruction of all exposed livestock.

Increased susceptibility of livestock to disease. This has occurred because of changes in husbandry practices - from sterilization programs to dehorning, branding, and hormone injections - and from the overuse and misuse of antibiotics.

- Insufficient farm/food-related security and surveillance.

Farms seldom incorporate vigorous means to prevent unauthorized access; most animal auctions and barn sales are devoid of organized on-site surveillance; and food processing and packing plants tend to lack uniform security and safety preparedness measures, particularly the small- and medium-scale facilities that have proliferated in recent years.

- An inefficient passive disease-reporting system. Responsibility for reporting unusual occurrences of animal disease lies with livestock producers, who may have disincentives for doing so because of the lack of a consistent program for agricultural indemnity.

Inappropriate veterinarian and diagnostic training. The number of veterinarians able to recognize and treat foreign livestock diseases is declining, reflecting a relatively poorly paid profession that suffers from a lack of appropriate training in exotic animal epidemiology.

A focus on aggregate rather than individual livestock statistics. The movement toward

larger herds and breeding operations largely precludes the option of attending to animals individually, making it more likely that emerging diseases will be overlooked.

Biological weapons arsenal contains microorganisms, which although do not pose a direct threat to health or life of a population, nevertheless, through the destruction of crops, can contribute to serious economic losses, both directly (through the loss of crops), as well as indirectly (through the need of allocating additional budgetary appropriations for food imports). The state's economic losses are enormous, even when an epidemic occurs naturally. In 1970, the so-called yellow leaf blight of corn resulted in losses exceeding \$1 billion in the United States.

Organisms harmful to plants are treated primarily as an economic weapon, because they do not cause imminent danger to health and life of humans or animals. Pathogenic plant organisms, which are transferred between continents, to areas with similar climatic conditions, constitute a particularly high risk. If protective actions are not taken in due course, these organisms (not coming in contact with any natural defense mechanisms of the new environment) will mass spread, causing damage to crops and natural plant communities.

Examples of these are: the **potato blight** (brought to Europe from America) or the **bacterial wilt** (potato disease detected in Bulgaria and brought to Asia and America). To counter these types of threats, organized forms of plant protection are put in place, which are legislated by the appropriate legal framework and properly organized actions. The issue of combating organisms that are harmful to plants and preventing their spread on a global level, is regulated by the "*International Plant Protection Convention*" (IPPC) FAO (Rome, 12/06/1951) and the "*Agreement on the Application of Sanitary and Phytosanitary Measures*" WTO (01/01/1995). On a national level, rules and obligations relating to the protection of plants are regulated by

the “Law on the protection of cultivated plants” (07/12/1995) with subsequent amendments.

The possibility of obtaining such biological weapons by terrorists directly from the environment, is negligible. It seems much easier to obtain infected plants and illegally import them into a country that is under attack. Another source of such weapons are the biological weapons proliferation states, such as the former Soviet Union, Great Britain, the USA, or Japan. In all of these countries, production programs of various plant pathogens were carried out over the past few decades.

One of the microorganisms – a subject of great interest for the designers of biological weapons (due to the high resistance of its spores to the unfavorable weather conditions and the incredible rate at which they spread) was the fungus, which causes **wheat stem rust**. Special bombs filled with bird feathers and contaminated with this pathogen were developed, when dropped in various places, it would cause a local outbreak. Another subject of interest is the fungus that causes **wheat smut**, which not only effectively eliminates crops, but also produces a flammable substance that could cause an explosion of the stored grain.

4. Consequences of Agroterrorist Attacks

It is well-known that agriculture is a vital economic branch of all countries; therefore, a biological attack on the agricultural sector could have far-reaching consequences such as [17]:

- profound disorganization of social life;
- destabilization of social and political structures;
- direct losses of crops or livestock, which in turn can lead to food shortages, dramatic increases in food prices, and unemployment;
- multiplying effects would ripple through the economy due to decreased sales of

agriculturally dependent businesses (farm input suppliers, food manufacturing, transportation, retail grocery, and food service) and tourism;

- losses resulting from actions that are meant to restrict the effects of illness outbreaks (interventional slaughtering of livestock and destruction of crops), which can exceed by several times the magnitude of losses resulting directly from the illness alone;
- the government could bear significant costs, including eradication and containment costs and compensation to producers for destroyed animals;
- losses resulting from the implementation of phytosanitary restrictions in the international trade;
- losses resulting from indirect effects (destabilization of the market).

5. Conclusion

Terrorism literature lists four fundamental factors in using the weapons of mass destruction: nuclear, radiological, chemical, and biological. From all of these, biological terrorism is considered to be the most dangerous, as it seems to pose the greatest threat because of its wide availability, cheapness, and high mortality rates caused by bacteria and viruses.

In recent years, there is a growing interest in the threat of using biological weapons by terrorists. Attacks caused by this type of weapons can have catastrophic consequences, including a mass death rate.

Agroterrorism is a little-known concept, but its effects can constitute a real threat to the economies of many countries. The meaning and motives behind an attack are well-known in the world and their execution is feasible despite the existence of borders between countries. For these reasons, we must be prepared for this type of eventuality and so should our economy.

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