

## Agro-Warfare: Attack on Crops and Livestock

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### Summary

One of the chief consequences of the world wars was the development of better and sophisticated weapon systems. It signified a transition from traditional to non-conventional means of warfare that included biological weapons (BW). These weapons are varied kinds and can also constitute the development of anti-crop agent which can trigger a famine across the country and the intentional outbreak of animal diseases to target the livestock of the nation. These attacks have a long term effect on the economy and health of the population. With weapons aiming to destroy the long term sustainability of a country, the need to enhance the security mechanisms, to mitigate their use becomes inevitable.

The outbreak of two dreadful world wars led to the emergence of the need to develop better and sophisticated weapon systems to defeat the enemy. On both sides of the battleground, innovations led to the creation of deadly and destructive forces, which reinforced the imminence of the end of humanity. This was further exacerbated with America dropping nuclear bombs on Japanese cities of Hiroshima and Nagasaki. This incident, alone, was a foremost and significant step in an apparent shift from the use of traditional means of warfare to non-conventional means of warfare. The concept of "weapons of mass destruction" comprising of nuclear, chemical and biological weapons witnessed an expansion. With numerous advances being made in the development of such weapons presently, the threat of them being employed in case of warfare has become imminent.

### Conceptualizing Germ-Warfare

Biological weapons have been in use since the time of the Romans, to spread diseases, incapacitate or destroy the enemy population, crops as well as their livestock.<sup>1</sup> However, their use and its potential to cause harm have been hidden from the public eye. With the recent developments in science and biotechnology, a valuable contribution have been made to the production of biological weapons, which begets the need to understand their use and the potential harm they pose in the future.

Biological Weapons can be described as "micro-organisms that infect and grow in the target host, producing a clinical disease that kills or incapacitates the target. Such microbes may be natural, wild-type strains or may be the result of genetically engineered organisms."<sup>2</sup> These viruses can spread via water, air and soil. It also includes germ

warfare as well as entomological warfare. According to the U.S. government, biological warfare is "the intentional cultivation or production of pathogenic bacteria, fungi, viruses... and their toxic products, as well as certain chemical compounds, for the purpose of producing disease or death." <sup>3</sup>

Biological weapons differ from conventional weapons in all aspects. First, the pathogens used are highly infectious and do not distinguish between self-forces and non-self-forces. Moreover, these weapons require only a small number to produce in large quantities. They differ from other nuclear and chemical weapons. It is a cumbersome and time-consuming task to detect the release of a virus. This is because the virus requires an incubation period before its effects can be seen on the victims. This works to the advantage of the aggressor to remain undetected, as no effects are immediately observed. There are chances of it being considered as a natural outbreak, thus, concealing the attacker. Moreover, biological weapons are economical to manufacture, as compared to nuclear and chemical weapons. As it can be easily employed by weaker nations and terrorist organizations who lack the capability to produce nuclear weapons, thus, being called "the poor man's weapon of mass destruction." <sup>4</sup> And they pose a threat, if not greater but equal to chemical and nuclear weapons. Thus, "a country lacking the technological know-how to produce atomic bombs can still make weapons that could set off devastating famines or economic losses."<sup>5</sup>

At the same time, there are a number of disadvantages associated with production and use of biological weapons, such as the probability of spread of virus, disease, bacteria among the populations of the attacker nation, in the process of developing it. Global warming and the inter-connectivity among nations increases the difficulty to

contain the spread of such contagious virus. There are, also, issues related to the effective spread of such bacteria, for example, agents in the form of spores released for contaminating the crops might be affected by wind patterns or rainfall. Thus, hampering the efficiency, and to maintain the same, biological agents need to be stored in a special facility.

Since ancient times, various forms of biological means of warfare have been employed to counter the enemy like the practice of poisoning water bodies in the enemy area. In addition to this, there was the practice of spreading contagious diseases such as smallpox and bubonic plague in the enemy grounds, through dead bodies of the infected victims. This was witnessed in 1346 when the Tartar troops hurled the bodies of plague victims in the city of Kaffa to kill large masses of people. To counter the Delaware Indians, in 1763 the English soldiers famously traded blankets of smallpox and measles victims with them. <sup>6</sup> During the Second World War, the Japanese employed the strategy of germ warfare against China, in the form of contaminated food and plague-infected bombs. Starvation was another method used as a form of indirect biological warfare, during the Second World War, by the Nazis against the Jews. In 2001, in the Amerithrax case, anthrax-poisoned letters were delivered to media houses and senators, killing five people. <sup>7</sup> Along with these, the future threat of biological weapons being aimed at crops and livestock have become a dangerous potential.

### **Anti-Crop Warfare**

Development of biological weapons, for the purpose of damaging the crops, could be traced back to British, French, German and Japanese efforts to develop herbicides, especially during the Second World War. Its earliest use can be found in Malaya against

the communist forces by the British in the 1950s.<sup>8</sup> This was further utilized by the Americans to deploy the herbicide agent Orange on a large scale in Vietnam in the 1960s to reduce the dense forest cover, which resulted in visible destruction of the environment and affected the lives of the Vietnamese people as well as the American troops stationed there. It led to the formation of the international treaty of Environmental Modification Convention (ENMOD), which entered into force in 1978. It prohibits the use of hostile military weapons for the purpose of environmental modification. It does not directly enforce a ban on the use of herbicides.<sup>9</sup>

However, the 1960s witnessed a consistent pursuit of the biological weapons programme, especially by the two power blocs namely, the US and the Soviet Union. In recent years, the anxiety with regard to biological weapons peaked with the possession of weapons of destruction, by Iraq in the 1980s, dealing with bioweapons like anthrax and various types of toxins. Apart from this, there have been claims that Iraq was developing a herbicide called wheat smut fungus.<sup>10</sup>

There are numerous varieties of a crop, which are suitable to a particular set of climate, soil and are sensitive to certain viruses. These 'crop pathogens' are tailored to take advantage of these properties by isolating them and developing weapons, like bombs, targeting the particular crop. The pathogens are easily spread among plants in the form of spores. This destruction of crops has a strained effect on the economy of the country. For example, this can be observed from the natural outbreak of crop diseases like the spread of leaf blight (plant disease) in America in the 1970s, which destroyed crops amounting to 1 million USD. Coffee leaf rust in the 19<sup>th</sup> century destroyed numerous coffee plantations in Southeast Asia. The

spread of famine in Bengal in 1942-43 could be attributed to the spread of brown spot disease in the rice crop, which led to the starvation of two million people.<sup>11</sup>

Such a kind of warfare can be highly detrimental for developing and undeveloped nations which depend on one crop as its staple food sources, such as rice or wheat. The damage caused by an anti-crop agent can trigger famine across the country, leading to extreme starvation and malnutrition. At the same time, resulting in a reduced resistance against diseases, among the population. This kind of attack, thus, proves to be equally destructive, just like a conventional military attack. And damaging more so, with a long term effect on the economy and health of the population.

Since the 1980s and continuing in 2000s, the US Congress has approved a bill based on anti-drug program worth 23 million USD, targeting the drug plants like cocaine, marijuana and heroin through 'plant pathogens'. This violates the BTWC (Biological Toxin Weapons Convention), however, it has been proposed that it shall be used in cooperation with drugs-producing states. This program has also been opposed on the ground that it might spread to other plants, might be used without the consent of drug producing states and most importantly, it can provide practical knowledge to further develop "aggressive, offensive biological warfare targeting food crops."<sup>12</sup>

Beginning in 2014, Israel has been spraying highly concentrated harmful herbicides along the Gaza Strip which houses the farms of multiple Palestinians.<sup>13</sup> These herbicides have resulted in a massive amount of crop damages as well as exposure to numerous health risks like cancer. It also affects the crops on the Israeli side of the border. This has been amounting to a violation of international law and a number of

Palestinian-based groups are demanding accountability and compensation for these losses, but it has been to no avail.<sup>14</sup> This was started after the 2014 conflict with Israel, wherein they destroyed the Palestinian agricultural experiment station as well, which was vital for Palestine to achieve self-sufficiency in agriculture.

According to the United Nations, more than 10 crop diseases have been identified which has the potential to be converted into a weapon, internationally. The crops which are high at risk include wheat, rice, corn, sugarcane, potatoes, coffee and different kinds of fruits, etc. Thus, anti-crop weapons can have a drastic impact on the economy, making their prevention a critical issue in the international community.

Presently, there is a Biological and Toxin Weapons Convention (BTWC -1972) in place, which needs to be strengthened. Simultaneously, there is a requirement of an organization similar to IAEA (International Atomic Energy Agency) to keep a check on the development, possession and use of biological weapons by the countries. However, the political interests of states and economic interests of the corporates have faltered these efforts. Thus, leading to "creation of a devastating range of new weaponry, some of which is certain to be aimed at the food crops that feed billions of the world's citizens."<sup>15</sup>

### **Warfare against Livestock**

Apart from harming the crops, the intentional outbreak of animal diseases is another weapon which has the capacity to reduce drastically, if not completely, the food supplies. Livestock has also been a vital target wherein highly infectious diseases like viral mycotic infection, encephalitis, rinderpest, foot-mouth-disease (FMD), African swine fever, tularemia are prominent. There has

not been an incident of livestock attack, however, the probability of the same is quite high. It presents itself in the form of a direct attack on the targeted nation's food supplies and the economy. It can be employed by a weak nation against a highly developed nation in the process of uneven warfare.

With numerous changes in the livestock industry over the years, its transformation from a "highly localized industry" to a "geographically dispersed industry", has taken place. Thus, the constant movement of animals makes it easier for a terrorist to plant an attack in the form of a virus in a few strategic locations. The swine flu epidemic in the Netherlands in 1997 is a prime example of the spread of disease due to the movement of people. Additionally, the 2007 outbreak of FMD in Britain resulted in the establishment of control zones to restrict the movement of animals in order to prevent the spread of disease.<sup>16</sup>

It is difficult to ascertain the harm caused to the economy of a country, due to the spread of such diseases. Considering a hypothetical scenario of a breakout of contagious livestock disease in America, which is the largest exporter of beef and pork in the world, the export markets would drastically collapse and rupture the American economy. The 2001 FMD attack in Britain cost the country a loss worth of 6 million USD from "livestock death, slaughter, carcass disposal, environmental protection, quarantine, custom searches, loss of market value, and lost tourism."<sup>17</sup>

FMD is a deadly disease, as it affects the animals greatly and causes their death in large numbers, bearing unprecedented loss in the form of decreased milk and meat production. Earlier Denmark was the leading exporter of pork to Japan, however, after the outbreak of FMD in 1982 in Denmark, Taiwan became the largest pork exporter to

Japan. However, after the FMD outbreak in Taiwan in 1997, there was a loss of 40% of the pig population, thus, causing a dramatic fall in demand for pork. Soon, America took over the title of the largest pork supplier to Japan.<sup>18</sup> Thus, it can be observed that FMD negatively affected the economies of Denmark and Taiwan.

These viruses are quite dangerous as they do not need any specific means to be transmitted, as they can easily spread from one animal to the other. At the same time, the attacker, need not require any specialised training to obtain the diseased pathogens or to transmit it among a large number of animals. With the spread of the disease through natural means of contact between the infected animal and other animals, the terrorists witness a growth in their arsenal, without much hassle. And unlike anti-crop agents, the attacker need not protect their own human populations against the virus, as “many of the most economically devastating livestock diseases do not infect humans”<sup>19</sup>. However, the possibilities of the virus being developed to affect the human population are being considered, for the purpose of research in human immunization.

### **The Way Forward**

There is an urgent need to find proper ways to mitigate and prevent the use of such weapons. For this, an in-depth awareness and understanding of their potential are required. Advances like the development of a neutron bomb in the Cold War days was proposed to destroy all forms of life, without damaging the surrounding infrastructure or the inception of the secret South African biological and chemical warfare programme Project Coast, wherein the plan to embed the weapons with certain gene types to target a particular population, has been considered. These developments reinforce the need to enhance security mechanisms.<sup>20</sup>

As mentioned above, along with the strengthening of BTWC, there is an imminent need for an organization to enforce verification on the development of biological weapons across the countries. At the same time, sharing of intelligence of possible bioterrorist attack can contribute towards early detection. Early detection helps in reducing the impact of the disease, especially in terms of livestock wherein the infected animals are isolated, so as to prevent further transmission of diseases.<sup>21</sup>

At the domestic and regional level, there should be the expansion of services which facilitate early detection, through adequate funds and staff. At the same time, development and stockpiling of vaccination for animals and pesticides for crops, which make them resistant to various diseases, is the need of the hour. Along with this, comprehensive planning and consensus in developing a list of major threats from biological weapons, across the globe, is a vital requirement. Various “strategies and technologies” to handle such an outbreak needs to be devised by the respective governments, domestically as well as internationally.<sup>22</sup> At the same time, various health professionals like doctors, nurses, veterinarians, microbiologists need to be trained to recognize the spread of a deliberate outbreak and respond quickly.<sup>23</sup>

The vulnerability to such weapons shall exist, however, with efficient response, the extent of damage can be reduced if not completely eliminated. Thus, BW is clearly lies in the category of mass destructive that does not necessarily include injuries to people but can threaten economy through damage to livestock or crops as well.

### **Endnotes:**

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- <sup>4</sup> See note 1, p. 84.
- <sup>5</sup> See note 3, p. 72.
- <sup>6</sup> See note 1, p. 71-72.
- <sup>7</sup> Ibid, p. 71.
- <sup>8</sup> See note 3, p. 73.
- <sup>9</sup> Ibid, p. 73-74.
- <sup>10</sup> Ibid, p. 70.
- <sup>11</sup> Ibid, p. 72-73.
- <sup>12</sup> Ibid, p. 75.
- <sup>13</sup> Aldabbour, B. (2016). Israel spraying toxins over Palestinian crops in Gaza. Retrieved from <https://www.aljazeera.com/news/2016/01/israel-spraying-toxins-palestinian-crops-gaza-160114063046813.html>
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- <sup>19</sup> Ibid, p. 579.
- <sup>20</sup> See note 1, p. 84.
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