IS BIOLOGICAL WARFARE A HIGHER THREAT THAN NUCLEAR WARFARE?

INTRODUCTION:

A weapon of mass destruction could also be a nuclear, radiological, chemical, biological, or the opposite weapon which can kill and convey significant harm to numerous humans or cause great damage to human-made structures (e.g., buildings), natural structures (e.g., mountains), or the biosphere. The scope and usage of the term has evolved and been disputed, often signifying more politically than technically.

A weapon of mass destruction is a device that derives its destructive force from nuclear reactions, either fission or from a mixture of fission and fusion reactions. Both bomb types release large quantities of energy from relatively small amounts of matter.

The only country to possess used a weapon of mass destruction in war is that the U.S., which dropped two atomic bombs on the Japanese cities of Hiroshima and Nagasaki during war II.

There are eight countries that have declared they possess weapon of mass destructions and are known to possess tested a nuclear weapon, only five of which are members of the NPT. The eight are China, France, India, North Korea, Pakistan, Russia, the UK, and therefore the U.S. Israel is taken into account by most analysts to possess nuclear weapons numbering within the low hundreds also, but maintains a politician policy of nuclear ambiguity, neither denying nor confirming its nuclear status.

South Africa developed a little nuclear arsenal within the 1980s but disassembled them within the early 1990s, making it the sole country to possess fully given up an independently developed nuclear weapons arsenal. Belarus, Kazakhstan, and Ukraine inherited stockpiles of nuclear arms following the break-up of the Soviet Union, but relinquished them to the Russia.

Biological weapon, also called germ weapon, any of kind of disease-producing agents such as bacteria, viruses, rickettsia, fungi, toxins, or other biological agents that could even be utilized as weapons against humans, animals, or plants.

The direct use of infectious agents and poisons against enemy personnel is an ancient practice in warfare. Indeed, in many conflicts, diseases are liable for more deaths than all the employed combat arms combined, even once they haven't consciously been used as weapons. Lethal biological weapons could also be capable of causing mass deaths, but they're incapable of mass destruction of infrastructure, buildings, or equipment. Nevertheless, because of the indiscriminate nature of those weapons as well because the potential for starting widespread pandemics, the matter of controlling disease effects, and thus the simple fear that they inspire most countries have agreed to ban the whole class.

NUCLEAR WEAPONS:

On Transfiguration, 1945, the planet changed forever when the primary atom bomb hit Hiroshima, Japan, killing thousands of individuals instantly. Three days later, a second atom bomb was dropped on Nagasaki, decisively ending Japan's involvement in war II. Thousands of individuals died from radiation poisoning within a year. Since that earth-shattering day, the planet has grappled with a controversial technology that not only poses strategic risks in its ability to wipe out humanity but also provides a possible solution to problems of sustainable energy.

The Hoover Institution features a long relationship with nuclear history. The Library & Archives house the first strike orders and pictures taken of the nuclear strikes on Hiroshima and Nagasaki, acquired from Harold Agnew, alongside his papers. Agnew worked at the Los Alamos Scientific Laboratory during war II and was an observer on the good Artiste, a B-29 that flew behind the Enola Gay on the primary atomic strike mission. The Agnew atom bomb footage is that the most-requested movie film in Hoover's collections. His papers include newspaper clippings from the time documenting how people grappled with the news of the attack. The clippings evince an air of newfound terror tinged with fascination about nuclear technology. The Library & Archives also house collections of newspapers from the Marshall Islands during the nuclear testing at Bikini Atoll within the 1940s and 1950s, and therefore the papers of physicist Teller and nuclear strategist Albert Wohlstetter, also as a number of the papers of physicist Sidney Drell.

Since the primary atom bomb dropped, world leaders are forced to deal with the strategic reality of nuclear arms. Few understand this better than former secretary of state and Thomas W. and Susan B. Ford Distinguished Fellow George Shultz. In his book Learning from Experience, Shultz wrote about his vision for global nuclear disarmament:

Out of office and out of Washington, I and my good friends and colleagues Sid Drell, Kissinger, Bill Perry, and Sam Nunn attempt to keep the flame burning in order that when and if the worldwide atmosphere improves, the ideas stand able to help lessen our dependence on nuclear weapons with their ability to wipe out humanity.

From the start of our appeals, my colleagues and that i have stressed that the planet is complicated. We highlight the regional conflicts that might need to be settled. We mean that a world without nuclear weapons wouldn't be the planet because it is, minus nuclear weapons. Steps to make the conditions for a world without nuclear weapons can't be ignored. As an example, conflicts have driven decisions to accumulate nuclear weapons in Northeast Asia, South Asia, and therefore the Middle East.

Ellis Jr., Jim Timbie, Jeremy Carl, James Goodby, and lots of others still research and consider the risks of nuclear arms, while also recognizing the advantages of atomic energy. Ellis and Shultz wrote that our energy problems can't be solved with Nuclear power alone. But we don't think they will be solved without it. One of us, between other jobs, built nuclear plants for a living; between other jobs, the opposite helped make them safer. In many respects, this is often a

private topic for us both. They acknowledge America's strategic position because the world's largest atomic power generator. They argue that America must bring the country's brightest minds and technologies to navigate atomic energy research and development responsibly and make sure that may be a part of a cleaner global energy system. Though the decades since the primary atom bomb was dropped have brought fear about such powerful weapons, it's perhaps to be hoped that the chances of atomic energy can make the longer term bright.

BIOLOGICAL WEAPONS:

Biological warfare is distinct from nuclear warfare, chemical operations and radiological warfare, which alongside Biological weapons structure CBRN, the military initials for nuclear, biological, and chemical operations using weapons of mass destruction. None of those are considered conventional weapons, which are deployed primarily for his or her explosive, kinetic, or incendiary potential.

Biological weapons could also be employed in various ways to realize a strategic or tactical advantage over the enemy, either by threats or by actual deployments. Like some chemical weapons, biological weapons can also be useful as area denial weapons. These agents could also be lethal or non-lethal, and should be targeted against one individual, a gaggle of individual, or maybe a whole population. They'll be developed, acquired, stockpiled or deployed by nation states or by non-national groups. Within the latter case, or if a nation-state uses it clandestinely, it's going to even be considered bioterrorism.

Biological warfare and chemical operations overlap to an extent, because the use of poisons produced by some living organisms is taken into account under the provisions of both the Biological Weapons Convention and therefore the Chemical Weapons Convention. Toxins and psychochemical weapons are often mentioned as mid-spectrum agents. Unlike bioweapons, these mid-spectrum agents don't reproduce in their host and are typically characterized by shorter incubation periods.

The use of biological weapons is prohibited under customary international humanitarian law, as well as a spread of international treaties. The utilization of biological agents in armed conflict may be a crime.

Offensive biological weapons, including production, stockpiling, and use of biological weapons, was outlawed by the 1972 Biological Weapons Convention (BWC). The rationale behind this treaty, which has been ratified or acceded to by 170 countries as of April 2013, is to stop a biological warfare which could conceivably end in large numbers of civilian casualties and cause severe disruption to economic and societal infrastructure. Many countries, including signatories of the Biological Weapons Convention, currently pursue research into the defense or protection against biological weapons, which isn't prohibited by the Biological Weapons Convention.

A nation or group which can pose a reputable threat of mass casualty has the power to change the terms on which other nations or groups interact with it. Biological weapons leave the potential to make a level of destruction and loss of life far in more than nuclear, chemical or conventional weapons, relative to their mass and price of development and storage. Therefore, biological agents could also be useful as strategic deterrents additionally to their utility as offensive weapons on the battlefield.

As a tactical weapon for military use, a big problem with a biological weapons attack is that it might take days to be effective, and thus won't immediately stop an opposing force. Some biological agents (smallpox, pneumonic plague) have the potential of person-to-person transmission via aerosolized respiratory droplets. The features are often undesirable, because the agent could also be transmitted by this mechanism to unintended populations, including neutral or maybe friendly forces. Worse still, such a weapon could "escape" the laboratory where it had been developed, albeit there was no intent to use it - for instance by infecting a researcher who then transmits it to the surface world before realizing that they were infected. Several cases are known of researchers becoming infected and dying of Ebola, which that they had been working with within the lab (though nobody else was infected in those cases) - while there's no evidence that their work was directed towards BW, it demonstrates the potential for accidental infection even of careful researchers fully conscious of the risks . While containment of biological weapons is a smaller amount of priority surely criminal or terrorist organizations, it remains a big concern for the military and civilian populations of virtually all nations.

ANTIQUITY AND MIDDLE AGE:

Rudimentary sorts of Biological weapons are practiced since antiquity. The earliest documented incident in Hittite texts of 1500–1200 BC of the intention to use biological weapons is recorded, during which victims of tularemia were driven into enemy lands, causing a plague. Although the Assyrians knew of ergot, a parasitic fungus of rye which produces ergotism when ingested, there's no evidence that they poisoned enemy wells with the fungus, as has been claimed. Scythian archers dipped their arrows and Roman soldiers their swords into excrements and cadavers victims were commonly infected by tetanus as result. Over the walls of the besieged Crimean city of Kaffa, the bodies of Mongol warriors of the Golden Horde who had died of plague were thrown in 1346. Specialists disagree over whether this operation may are liable for the spread of the Black Death into Europe, Middle East and North Africa , leading to the killing of roughly 25 million Europeans.

The British Army attempted use of smallpox against Native Americans during the Siege of Fort Pitt in June 1763. A reported outbreak that began the spring before left as many together hundred Native Americans dead in Ohio Country from 1763 to 1764. it's not clear, however, whether the smallpox was a results of the Fort Pitt incident or the virus was already present among the Delaware people as outbreaks happened on their own every dozen approximately years and therefore the delegates were met again later and that they seemingly hadn't contracted smallpox.

It's likely that British Marines used smallpox in New South Wales, Australia, in 1789. Dr. Seth Carus (2015) states: "Ultimately, we've a robust circumstantial case supporting the idea that somebody deliberately introduced smallpox within the Aboriginal population."

By 1900 the scientific theory and advances in bacteriology brought a replacement level of sophistication to the techniques for possible use of bio-agents in war. During war I (1914–1918), on behalf of the Imperial German government, biological sabotage within the sort of anthrax and glanders was undertaken with indifferent results. The Geneva Protocol of 1925 prohibited the utilization of chemical and biological weapons.

With the onset of war II, the Ministry of Supply within the UK established a biological weapon program at Porton Down, headed by the microbiologist Paul Fildes. The research was championed by Churchill and shortly tularemia, anthrax, brucellosis, and botulism toxins had been effectively weaponized. Especially, Gruinard Island in Scotland was contaminated with anthrax during a series of in depth tests for subsequent 56 years. Although the United Kingdom never offensively used the biological weapons it developed, its program was the primary to successfully weaponize a spread of deadly pathogens and convey them into industrial production. Other nations had also begun their own biological weapons programs.

When the U.S. entered the war, Allied resources were pooled at the request of British and therefore the U.S. established an outsized research program and industrial complex at Fort Detrick, Maryland in 1942 under the direction of George W. Merck. At the Dugway Proving Grounds in Utah, the biological and chemical weapons developed during that period were tested. Although the war was over, there have been facilities for the production of anthrax spores, brucellosis, and botulism toxins before these weapons might be of much operational use.

The most notorious program of the amount was travel by the key Imperial Japanese military unit 731 during the war, based at Pingfan in Manchuria and commanded by general officer Shirō Ishii. Imperial Japanese military unit 731 did research on biological weapons, conducted often fatal experiments on prisoners, and produced biological weapons for combat use. The Japanese effort far outstripped in its widespread application and indiscriminate brutality although they lacked technological sophistication of the American or British programs. In several military campaigns, biological weapons were used against both Chinese soldiers and civilians. In 1940, the Japanese Army Air Force bombed Ningbo with ceramic bombs filled with fleas carrying the plague. Many of those operations were ineffective thanks to inefficient delivery systems, although up to 400,000 people may have died. During the Zhejiang-Jiangxi Campaign in 1942, around 1,700 Japanese troops died out of a complete 10,000 Japanese soldiers who fell ill with disease when their own biological weapons attack rebounded on their own forces.

During the ultimate months of war II, Japan planned to use plague as a bioweapon against U.S. civilians in San Diego, California, during Operation Cherry Blossoms in the dark. The plan was

set to launch on 22 September 1945, but it had been not executed due to Japan's surrender on 15 August 1945.

In Britain, the program of weaponization of plague, brucellosis, and tularemia and later with equine encephalitis and vaccinia viruses were produced in 1950, but the programme was unilaterally cancelled in 1956. The U.S. Army Biological Warfare Laboratories weaponized anthrax, tularemia, brucellosis, Q-fever et al.

In 1969, the United Kingdom and therefore the Warsaw Pact, separately, introduced proposals to the UN to ban biological weapons, and US President Nixon terminated production of biological weapons, allowing only research project for defensive measures. In 1972, the Biological and Toxin Weapons Convention was signed by the nations, as a ban on development, production and stockpiling of microbes except in amounts necessary for protective and peaceful research. However, during a program called Biopreparat, the Soviet Union continued research and production of massive offensive biological weapons, despite having signed the convention. As of September 2018, 182 countries have ratified the treaty, and none are proven though nine are still suspected to possess offensive Biological Warfare programs.

AS A WAY OF TERRORISM:

Biological weapons are difficult to detect, economical and straightforward to use, making them appealing to terrorists. The value of a bioweapon is estimated to be about 0.05 percent the value of a standard weapon so as to supply similar numbers of mass casualties per kilometer square. Moreover, their production is extremely easy as common technology are often wont to produce biological weapons , like that utilized in production of vaccines, foods, spray devices, beverages and antibiotics. A serious think about Biological weapons that draws terrorists is that they will easily escape before the government agencies or secret agencies have even started their investigation. This is often because the potential organism has a time period of three to 7 days, after which the results begin to seem, thereby giving terrorists a lead.

A technique called Clustered Regularly Interspaced Short Palindromic Repeat (CRISPR-Cas9) is now so cheap and widely available that scientists fear that the amateurs will start experimenting with them. During this technique, a DNA sequence is stop and replaced with a replacement sequence or code that codes for a specific protein or characteristic, which could potentially show up within the required organism. Though this system may be a breakthrough and is commendable, it can cause serious issues and potential danger if employed by people with wrong intentions. Concerns have emerged regarding do-it-yourself biology research organizations thanks to their associated risk that a rogue amateur DIY researcher could plan to develop dangerous bioweapons using genome editing technology.

In 2002, when CNN went through Al-Qaeda's experiments with crude poisons, they acknowledged that Al-Qaeda had begun planning ricin and cyanide attacks with the assistance of a loose association of terrorist cells. The associates had infiltrated many countries like Turkey,

Italy, Spain, France et al. In 2015, to combat the threat of bio-terrorism, a National Blueprint for Biodefense was issued by the Blue-Ribbon Study Panel on Biodefense. Also, 233 potential exposures of select biological agents outside of the first barriers of the bio-containment within the US were described by the annual report of the Federal Select Agent Program.

Though a verification system can reduce bio-terrorism, an employee, or a lone terrorist having adequate knowledge of the corporate facilities, can cause potential danger by injecting a deadly or harmful substance into the power. Moreover, it's been found that about 95% of accidents that have occurred thanks to low security are done by employees or those that had a security clearance.

ENTOMOLOGICAL WARFARE:

Entomological warfare may be a sort of biological weapons that uses insects to attack the enemy. The concept has existed for hundreds of years and research and development have continued into the fashionable era. Entomological warfare has been utilized in battle by nations and has been accused of using an entomological warfare program. Entomological warfare may employ insects during a direct attack or as vectors to deliver a bio-hazard, like plague. Essentially, entomological warfare exists in three varieties. One sort of entomological warfare involves infecting insects with a pathogen then dispersing the insects over target areas. The insects then act as a vector, infecting a person or animal they could bite. Another sort of entomological warfare may be a direct insect attack against crops; the insect might not be infected with any pathogen but instead represents a threat to agriculture. The ultimate method uses uninfected insects, like bees, wasps, etc., to directly attack the enemy.

BIOLOGICAL WARFARE BY TARGET:

A rational state controller would never use biological weapons offensively. The argument is that the weapon could backfire and harm the military on the offensive, perhaps having even worse effects than on the target; in other words biological weapons can't be controlled. An agent like anthrax or other airborne harmful microorganism would almost certainly spread worldwide and ultimately infect the person’s home country. However, this argument doesn't necessarily apply to bacteria. For instance, anthrax can easily be controlled and even created during a garden shed; the FBI suspects it is often finished as little as $2,500 using readily available laboratory equipment.

Also, using microbial methods, bacteria are often suitably modified to be effective in just a narrow environmental range, the range of the target that distinctly differs from the military on the offensive. Thus only the target could be affected adversely. The weapon could also be further wont to hamper an advancing army making them more susceptible to counterattack by the defending force. Note that these concerns generally don't apply to biologically-derived toxins - while classified as biological weapons, the organism that produces them isn't used on the battlefield, in order that they present concerns almost like chemical weapons.

ANTI PERSONNAL:

Optimal features of a bio-hazard to be used as a weapon against human population are high infectivity, high virulence, and non-availability of vaccines and availability of an efficient and efficient delivery system. Stability of the weaponized agent, the ability of the agent to retain its infectivity and virulence after a protracted period of storage can also be desirable, particularly for military applications, and therefore the simple creating one is usually considered. Control of the spread of the agent could also be another desired characteristic.

The primary difficulty isn't the assembly of the bio-hazard, as many biological agents utilized in weapons are often manufactured relatively quickly, cheaply and simply. Rather, it's the weaponization, storage, and delivery in an efficient vehicle to a vulnerable target that poses significant problems.

For example, *Bacillus anthracis* is taken into account an efficient agent for several reasons. First, it is perfect for dispersal aerosols because it forms hardy spores. Second, this organism isn't considered transmissible from person to person, and thus rarely if ever causes secondary infections. An inhalation anthrax infection starts with ordinary influenza-like symptoms and progresses to a lethal hemorrhagic mediastinitis within 3–7 days, with a death rate that's 90% or higher in untreated patients finally, friendly personnel and civilians are often protected with suitable antibiotics.

Agents considered or known to be weaponized, include bacteria like *Bacillus anthracis , Chlamydophila psittaci, Brucella* spp., *Coxiella burnetii, Francisella tularensis* , a number of the Rickettsiaceae especially *Rickettsia prowazekii* and *Rickettsia rickettsii*, *Yersinia pestis* and *Vibrio cholerae*. Many viral agents are studied and weaponized, including a number of the Bunyaviridae especially valley fever virus, Ebola virus, many of the *Flaviviridae* especially Japanese encephalitis virus, Marburg virus, yellow jack virus and smallpox virus. Fungal agents that are studied include *Coccidioides* spp.

Toxins which will be used as weapons include ricin, enterotoxin B, neurotoxin, saxitoxin, and lots of mycotoxins. These toxins and therefore the organisms that produce them are sometimes mentioned as select agents. Within the U.S., their possession, use, and transfer are regulated by the Centers for Disease Control and Prevention's Select Agent Program.

Anti-personnel bio-agents was categorized by the former US bioweapon program as either Lethal Agents (*Bacillus anthracis*) or Incapacitating Agents (*Venezuelan equine encephalomyelitis* virus).

ANTI AGRICULTURE:

During the conflict that used plant diseases i.e., bioherbicides, or mycoherbicides, the U.S. developed an anti-crop capability for destroying enemy agriculture. Biological weapons also

target fisheries also as water-based vegetation. It had been believed that the destruction of enemy agriculture on a strategic scale could thwart Sino-Soviet aggression during a general war. To initiate epidemics among plants, diseases like wheat blast and rice blast were weaponized in aerial spray tanks and cluster bombs for delivery to enemy watersheds in agricultural regions. When the U.S. renounced its offensive biological weapons program in 1969 and 1970, the overwhelming majority of its biological arsenal was composed of those plant diseases. Enterotoxins and Mycotoxins weren't suffering from Nixon's order.

Though herbicides are chemicals, they're often grouped with biological weapons and chemical operations because they'll add an identical manner as bio toxins or bio regulators. The Army's Technical Escort Unit was liable for the transport of all chemical, biological, radiological materials because each agent was tested in the military Biological Laboratory. Scorched earth tactics or destroying livestock and farmland were administered within the Vietnam War (cf. Agent Orange) and Eelam War in Sri Lanka.

Biological warfare also can specifically target plants to destroy crops or defoliate vegetation. During the Second World War, the U.S. and Britain initiated an herbicidal warfare program that was eventually utilized in Malaya and Vietnam for counterinsurgency operations.

ANTI LIVESTOCK:

During war I, German saboteurs used anthrax and glanders to sicken cavalry horses in U.S. and France, sheep in Romania, and livestock in Argentina intended for the Entente forces one among these German saboteurs was Anton Dilger. Also, Germany itself became a victim of comparable attacks horses bound for Germany was infected with Burkholderia by French operatives in Switzerland.

During war II, the U.S. and Canada secretly investigated the utilization of rinderpest, a highly lethal disease of cattle, as a bioweapon.

In the 1980s Soviet Ministry of Agriculture initiated a key program which was code-named "Ecology". They had successfully developed variants of hoof-and-mouth disease, and rinderpest against cows, African swine fever for pigs, and psittacosis to kill the chicken. Then, these agents were prepared to spray them down from tanks attached to airplanes over many miles.

CONCLUSION:

Usage of nuclear weapons may cause destruction to human population when, for instance, atom bomb dropping in Hiroshima and Nagasaki which cause non-fertile land and genetic diseases for people living there. So far there wasn't even single grass has grown therein area. The people also so far are still suffering from genetic diseases generation after generation. But biological weapons which are much more lethal than nuclear weapons, for instance, usage of harmful microorganisms which causes infections spreading quickly causing death to human population at

higher rate. This explains that biological weapons are much more dangerous than the nuclear weapons. Biological weapons have the power to destroy the massive population of species than nuclear weapons.

Self declaration : This ideas are original and not plagiarized

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