The prohibition of biological warfare in international law. Evolution and developments in the 21st century

A thesis submitted to
The Department of Balkan, Slavic and Oriental Studies & Department of International and European Studies
University of Macedonia

In Partial Fulfilment of the Requirements for the Degree of Master in Human Rights and Migration Studies

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Thessaloniki, January 2022

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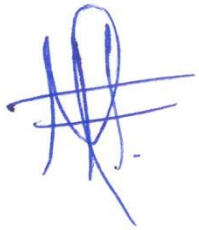

Acknowledgments

Taken the opportunity given with this dissertation, I would like to express my gratitude to the people who, with their support and valuable advice, helped me complete this essay. First, I would like to thank my supervisor, Associate Professor Nikolaos Zaikos of the MA in Human Rights and Migration Studies at University of Macedonia. Under his valuable supervision and with his proper and continuous guidance, showed me the proper way to write this interesting essay. Moreover, I would like to thank the second examiner, Assistant Professor Kalliopi Chainoglou of the MA in Human Rights and Migration Studies at University of Macedonia, for her immediate response concerning the examination and evaluation of my essay in a short period of time. Furthermore, I would like to thank the members of my family, my mother, my father and my sister for their endless patience and the meaningful psychological support during the writing of my dissertation. Thank you all.

Abstract

The prohibition of biological weapons and the deterrence of biological attacks are two of the most significant issues for the assurance of world peace and prosperity. The biological weapons are one of the three categories of Weapons of Mass Destruction (WMD), the other two being the nuclear and the chemical ones. The biological weapons, in order to be effective, make use of biological agents. The latter include microorganisms or toxins that can be responsible, once released, for the spread of a disease and, in most of the cases, even for death to humans, animals and plants. Due to certain unique features of the biological agents, the biological weapons are considered to be more powerful than the chemical and conventional weapons. The agents cannot be easily seen, they can be transmitted rapidly via the air and the infected food and water and, most of them, can be produced and developed within a short period of time. These characteristics are ideal and particularly attractive to those who intent to act secretly and insidiously having as an ultimate goal to provoke fear and panic. Possible perpetrators are the states, terrorist groups and individuals. The prohibition of use of biological weapons and of the production of biological agents has been institutionalized in many protocols and conventions, the most important being the Biological and Toxin Weapons Convention of 1972 (BTWC). Nevertheless, there will always be the doubt whether some states are still developing biological weapons and, therefore, there will always be the threat of a biological attack.

Contents

List of Abbreviations

BTWC: Biological and Toxin Weapons Convention

ICRC: International Committee of the Red Cross

ISC: International Scientific Commission for the Facts Concerning Bacterial Warfare in China and Korea.

UN: United Nations

UNSCOM: United Nations Special Commission

USA: United States of America

USSR: Union of Soviet Socialist Republics

VHF: Viral Hemorrhagic Fevers

WMD: Weapons of Mass Destruction

WHO: World Health Organization

WWI: World War I

WWII: World War II

Introduction

The prohibition of biological warfare is not a new topic in the international agenda, but especially today, its resolution becomes extremely important. The first cases of biological strategies being used by military forces, in order to eliminate their opponents, can be found in the ancient world. Throwing infected arrows, previously dipped into decomposed human bodies and contaminating the wells were tactics well known to ancient civilizations. These tactics were used also in medieval times when the spread of the plague disease caused the death to a large number of people. By the end of the 19th century, efforts were made to be prohibited the use of ‘‘asphyxiating poisonous gases’’, as they were called at that time.

The first steps toward the prohibition of poisonous weapons were taken in the Hague Conventions in 1899 and in 1907. The conventions, however, did not change radically the situation as they were not binding, especially during World War I (WWI), there was extensive use of chemical weapons. The next effort towards the prohibition of these weapons was the 1925 Geneva Protocol which prohibits the use of ‘‘*asphyxiating, poisonous or other gases and of all analogous liquids, materials or devices*’’ and bans ‘‘*bacteriological methods of warfare*’’. Fortunately, during World War II(WWII), there was no use of chemical weapons, however, several states, mainly, the two powerful states, the United States of America (USA) and the former Union of Soviet Socialist Republics (USSR) developed biological programs. The turning point for the prohibition of biological weapons was in 1972 with the BTWC. The convention was binding for all states and for the first time a separate treaty for biological weapons was signed.

The basic element for the weapons to be effective is the biological agent. The agent contains microorganisms which spread diseases and can cause illness and even death to humans, animals and the destruction of plants. The agents, in most cases, are not visible, can be easily found in the market, can be developed without any scientific experience and, most of the times, the perpetrators cannot be easily traced. Some states and non-state groups and, more specifically, terrorist groups are trying to take advantage of the above-mentioned characteristics and to take

actions with political and economic motives, with terrible consequences. The terrorist incident at the metro station in Japan, in 1995, using sarin agent and the terrorist attack with using anthrax on mail correspondence in USA, show that bioterrorism is a dangerous issue that must be resolved.

The purpose of this dissertation essay is the examination and the analysis of the significant issue of the prohibition of biological warfare in the context of international law. This essay cites all the relevant articles of international conventions and protocols which demonstrate the way in which states ban the biological weapons. Furthermore, there will be examination about the steps of development regarding the prohibition in the 21st century. For the completion of this essay, international law documents, scientific books related to the issue of biological warfare and scientific articles from the Internet have been used.

The essay consists of two parts. The first part includes data on biological weapons, which are useful in understanding these complex and dangerous weapons. More specifically, after the introduction, follows a chapter with important definitions which will form the basis for the examination of biological warfare. In the next chapter, there will be a historical retrospect about the use of biological weapons from ancient times till now and a reference will be made to some accusations related to the use of biological substances by the states. Furthermore, in the next chapter will be an analysis, concerning four biological programs, which were attractive in the global interest, the programs of the USA, the former USSR, South Africa, and Iraq. Moreover, the types of biological weapons will be examined, the characteristics of biological agents and the diseases they can spread.

In the second part of the essay there is an extent analysis about the international humanitarian law, the Geneva Protocol and BTWC. The issue of bioterrorism is also dealt with, along with the development measures and the mechanisms which are implemented in 21st century in order to eliminate the biological warfare incidents and the elimination of weapons of mass destruction. Moreover, Greece's stance on the issue is mentioned, and finally the conclusion and the references.

1. Definitions: Biological weapons, Biological warfare, Biological agents

a) *''Biological weapons are, along with the nuclear and chemical weapons, one of the three categories of the Weapons of Mass Destruction (WMD). The biological weapons in order to be destructive, there are two important components: a biological agent and a mean to disperse it''* (Švarc,2016). The biological weapons could be considered as different types of devices the purpose of which is to disperse and disseminate diseases or toxins in order to kill or to cause suffer to humans, animals and plants. The variety of biological weapons is quite large as it ranges from classic artillery to simple sprays and brushes (Švarc,2016).

b) The military art of biological warfare is not a current phenomenon, as it has already proved its dynamics throughout history and at the battlefields. Nowadays, two factors can be responsible for the eruption of biological incidents: a state and a non-state group and more specifically, a terrorist group which is called bioterrorist group (Švarc, 2016).

c) The biological agents are the necessary elements for the effectiveness of biological weapons. These agents consist of microorganisms, toxins, diseases, and any other organism which can be spread and infect other living organisms (Švarc, 2016). After their release, the agents are, to a large extent, lethal, the symptoms appear slowly and they can be very destructive, for instance, even if a small quantity of biological agent is released into a water supply, a great number of people will be badly infected (Švarc, 2016). In battlefields, biological weapons have no direct and efficient results because of the delayed effects of the biological agents (Švarc, 2016).

The biological agents can be used in an appropriate manner, causing long term weaknesses and difficulties to the rival army, such as an enforced quarantine in order to limit the dissemination of the biological agents, or the contamination on the food supplies or the destruction of arable lands. (Švarc, 2016). Finally, the biological agents can be used for political assassinations, in order to cause political and social chaos.

2. Historical biological warfare acts

It is indeed a challenge for the historians and the microbiologists to figure out if an epidemic has been caused by natural causes or by human involvement, as for the time before the first developments in microbiology, there exist neither reliable nor sufficient sources. In the middle of the 19th century, the crucial discovery of Louis Paster in France and Robert Koch in Germany that microorganisms can be responsible for diseases, overturned the data of medical science (Carus, 2017). Before this explanation came to light, that time, the causes of a disease were explained in several ways. Due to the absence of clear scientific data, a great part of the population gave explanations beyond any natural laws, such as the witchcraft or the ‘‘miasma’’ theory, which was widely known, and it was based on the assumption that the fumes of organic matter are mixed with the air and so the expanded dissemination is explained. (Carus 2017).

The use of biological agents in order to cause illness and death dates back to the ancient times. There are some from the Greek, Persian and Roman references in literature mentioning the use of animal cadavers for the contamination of the wells, as this was the most common form of contamination by poisoning the water supplies of the enemy (Flora, 2019). In 400 BC, Scythian archers infected their arrows by sticking them into decomposed bodies or in blood mixed with manure. In 190 BC, during the armed conflict of Eyrymed, Hannibal won a naval conflict over King Eumenes II of Pergamon by sending vessels full of lethal snakes to the enemy ships. In the 12th century AD, Barbarossa, during the battle of Tortona, used the corpses of his dead soldiers to pollute the wells (Flora, 2019).

The siege of Caffa, in 1346, is considered a crucial juncture for the world history. That year, a well-fortified port which was under the control of Genoese, it was attacked by the forces of the Tartars. In the meantime, at the camps of the Tartars, an epidemic of plague broke out. The Tartars took advantage of their misfortune to their own benefit, as they threw the infected cadavers into the city in order to start an epidemic within the walls of the city. This strategic tactic had as result, the eruption of the pandemic and the Genoese population was forced to retreat its position. It is believed that the outbreak of the plague epidemic at the siege of Caffa

was the main cause and the starting point for the most difficult and devastating period, not only for the European population, but also for those who lived in the Near East and the North Africa. It was the period of Black Death, and it was the biggest destruction for public health. The siege of Caffa is one of the events which show the catastrophic consequences that occur when biological tactics are followed (Flora, 2019).

In 1710, during the battle between Russia and Sweden at Reval in Estonia, the tactic of the catapulted infected cadavers was used. In the 18th century the British, in North America, gave to the Native Americans some blankets, used by smallpox patients first, with the purpose of the spread of contamination to the immunologically naïve tribes. There is an officially recorded incident of biological warfare tactic, which took place in 1763 at the Fort Pitt on the Pennsylvania frontier (Wheelis, 2004)

During the Pontiac war, the British provided the Native Americans with blankets and handkerchiefs, previously infected by smallpox patients. At the same time, an epidemic of smallpox broke out among the Indians (Wheelis, 2004). The last events in which the American Natives were the victims of a biological agent were in the period between the 1957 - 1965. The agents of the Brazilian Indian Protective Service transmitted illnesses such as the smallpox, tuberculosis and influenza to the Indians tribes of Amazon. As the Native Americans were unfamiliar to the european diseases, spreading an illness became an effective tactic during a war (Wheelis, 2004). In 1863, during the American Civil War, a surgeon was charged with the accusation of attempting to send yellow fever infected clothes to the north of the USA (Flora, 2019).

During the WWI, Germany sent infected horses and cattle, previously vaccinated with diseases that produced bacteria such as Bacillus anthracis (anthrax) and Pseudomonas Pseudomallei (glanders), to the USA, USSR and to other countries (Flora, 2019). Germany does not accept these accusations. In 1924, a subcommittee of the Temporary Mixed Commission of the League of Nations concluded that no bacteriological weapon had been used during the war. The next year, in 1925, the ‘‘Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases and of Bacteriological Methods of Warfare’’ was signed. However, the Protocol did not require compliance or assurance that all the States will adhere to the rules of the Protocol and the Protocol remained ineffectual. Countries such as Canada, Great Britain, Poland, Italy, the Netherlands, Japan, and the former USSR advanced

biological programs soon after their ratifications of the Protocol. USA ratified the Protocol in 1975 (Flora, 2019).

Japan, even before the beginning of WWII, developed biological agents as anthrax, cholera, shigellosis and the experiments were implemented on Chinese civilians and prisoners of war. One of the experiments was the use of ceramic bomblets, in which plagued infected fleas and grain were enclosed. Then, the contaminated fleas bit the rats and the plague spread throughout the Chinese cities (Flora, 2019). The Japanese biological program was responsible for many deaths. As soon as it became known that Japan had developed a biological program, in 1946, President Roosevelt officially announced a research program in order to be development in his country on the issue of the biological weapons. In 1969, President Nixon stopped the offensive program of the USA, and restricting it only for defensive purposes (Flora, 2019).

In 1972, the BTWC was signed by 103 States. According to the treaty, the States should destroy all their stock of the biological weapons. In 1979, an accident occurred in Sverdlovsk, in the former Soviet Union, Bacillus anthracis leaked, and 69 humans lost their lives. In 2001, in the USA and more specifically in Oregon, members of the Rajneesh cult, in an effort to influence the result of the municipal elections, they contaminated the restaurant of their local area with Salmonella typhimurium and at least 700 people were infected (Flora, 2019).

3. Accusations concerning the use of biological weapons

Due to various conflicts between states and in civil wars, there have been some allegations concerning the use of biological agents.

One of these allegations concerns Russia. During WWII, in 1942, at the Volga area in southern Russia, a pandemic broke out among the troops of Germany and then in the Russian forces. Group of scientists claimed that USSR army used biological agents and, more specifically Francisella tularensis, which caused tularemia and it is considered one of the most devastating bacteria and it can be easily spread among humans. 70% of the infections were pneumonic. On the other hand, some others, stated that the epidemic occurred due to natural reasons and did not originate from a human being. Regardless of the actual reasons behind the epidemic, 10.000 cases were finally reported due to this biological incident (Wheelis, 2004).

Furthermore, the USSR was blamed again regarding the biological warfare. The USA, in 1981, made a complaint that the USSR provided toxin weapons to Vietnamese forces in Cambodia and Laos (Wheelis, 2004). At these locations, some yellow spots upon the trees were found and because of their color, it became known as yellow rain. The accusations were based on chemical tests for tricothecene micro toxins and on the testimonies of Hmong refugees but at the end, it turned out to be only excrement of honeybees. The accusations were abandoned as the chemical test was negative regarding the toxins (Wheelis, 2004).

Moreover, the USSR was accused by the USA, for using tricothecene mycotoxins in the war of Afghanistan. At the same war, there were had been claims that the Soviet Union used bombs and spray tanks including glanders against the horses and soldiers (Wheelis, 2004).

The second allegation for biological warfare attack was against the USA. During the Korean War, North Korea accused the USA pilots for dropping off, of their airplanes infected objects and releasing infected insects for the purpose of the dissemination over the Korean population. Later, China favored of the Korean statement, and it accused the USA as well for the dissemination of biological agents. The issue has given rise to a great heated debate, and it was decided to send a group of people to investigate if the accusations were real (Wheelis, 2004).

The General Assembly proposed a UN Commission to investigate; the Secretary General recommended the World Health Organization (WHO); and the government of the USA suggested the International Committee of the Red Cross for the investigations. Japan rejected all three because it was afraid that these organizations would support the USA, irrespective of the final results. Those who undertook the investigation were two non-governmental organizations, the International Association of Democratic Lawyers and the World Peace Council. The latter introduced the International Scientific Commission for the Facts Concerning Bacterial Warfare in China and Korea (ISC). After its investigation, the ISC stated that there was no evidence of biological attack, but some claimed that the results of ISC were manufactured (Wheelis, 2004).

The third allegation is about the biological attacks of the USA against Cuba. Fidel Castro, in many of his speeches, blamed the USA for introducing diseases in Cuba. Most of them have never been proven but some of them are important to be mentioned. In 1962, a poultry expert from Canada stated to the press that the US CIA had offered and paid him 5000$ to contaminate the Cuban turkeys with Newcastle Disease virus. He had accepted the money but, at the end,

he refused to infect the turkeys, despite the fact that, after his departure from the island, the Newcastle disease begun but there was no any evidence (Wheelis, 2004).

The next claim was made in 1972 regarding the outbreak of the African Swine Fever. A month ago, before the outbreak, expatriate Cuban secret agents brought the disease from a US base in Panama to the southeast coast of the island. The testimonies were insufficient and again there was no proof (Wheelis, 2004). Another allegation of Cuba against the USA attracted the international attention. In 1996, an US agricultural spray airplane passed above the Cuban island, a Cuban pilot saw it releasing something. After two months, the insects Thrips palmi appeared on the island, where they had never been before. An outbreak started and Cuba accused the USA and the latter stated that the pilot of the aircraft released only smoke in order to become visible to the Cubans. Cuba asked for consultation and activated the Article V of the BTWC into action. Twenty countries stated that there was no sufficient evidence (Wheelis, 2004).

One more allegation concerns the State Law and Order Reconciliation Council government of Myanmar. The government was accused of attacking the ethnic group ‘‘Karen’’ with biological agents. The Karen Human Rights Group stated that there were many outbreaks of intestinal diseases which they were deadly for people and the cause was materials dropping from the government’s airplanes. As the Karen people claimed, the materials were formed by a parachute, a weather balloon, which it was full of bacteria and that the balloon broke because of a meteorological radiosonde. One of these equipment was investigated in the United Kingdom but with negative results, probably because of the time distance between the time of use and the time of the examination (Wheelis, 2004).

4. Biological programs

The use of biological weapons by the states has given rise to a great concern since the beginning of WWI and, especially during the Cold War when many countries developed biological programs. At the end of this era, during which, the sense of fear of an impending war and doubts about who the ally was and who the enemy was, was prevailed, the global attention, since the early ‘90s, focused on the possibility of the use of biological weapons by terrorist organizations (Wheelis, Rózsa, & Dando, 2006).

At the onset of 20^{t} century, following the discovery by physicians of the causes of the diseases and how the latter were transmitted from one living organism to another, many states became interested in using poisoning substances in war conflicts in order to have strategic advantage and to cause great upheaval in the enemy army. Germany followed this strategy in WWI, as it developed biological agents such as anthrax and glanders and it released them to military draft animals. After the end of the war, there was a general belief ‘‘*in the press and in military circles that the next major conflict would involve extensive use of chemical weapons (CW) and BW’’* (Wheelis, Rózsa, & Dando, 2006). Because of this situation many states became alarmed and wanted to get properly prepared for the extreme case of a chemical – biological war and began to develop biological programs (Wheelis, Rózsa, & Dando, 2006).

The development of these programs acted as deterrent to other states, or else would be activated only in case of retaliation and not for first use. Despite the fact that there existed the alarm of biological warfare, during WWII, no European or North American country produced biological weapons. Only United Kingdom developed a large quantity of five million cattle cakes of linseed meal laced with anthrax spores with the purpose of paralyzing the German domestic animals, but this biological weapon was only for retaliation purposes and at the end, it was never used during the war. Thus, during the war no chemical or biological substances were used on European soil (Wheelis, Rózsa, & Dando, 2006).

However, the case of European countries was not the same as that of the of Asian countries. Japan used chemical and biological agents against the Chinese civilians and soldiers. The mean of transmission, which was used by the Japanese, was the release of plague- infected rats or parasitic insects and the pollution of wells or foodstuffs. It is considered that thousands of Chinese were killed because of the Japanese methods and thousands of them were killed because they were *used as ‘‘human guinea pigs for infectious – disease experiments’’* (Wheelis, Rózsa, & Dando, 2006). Despite the fact that, even before WWII, in 1925, the Geneva Protocol was signed and prohibited the use of chemical and biological weapons during war, during the Cold War, a race of biological programs began between several countries in order to show their superiority over the other states (Wheelis, Rózsa, & Dando, 2006). The biological program of the USA, USSR, Iraq and South Africa will be examined in this chapter.

4.1. United States of America

After the war in 1945, the American leadership, fearing that the second largest and powerful force of that period, the former USSR, was preparing and developing its biological warfare equipment, felt that it had no choice but to start its own biological program. The beginning of the American biological program was encouraged by the deterrence theory and the practice of retaliation, and it found supporters mainly in those who believed that the Soviets who wanted to conquer and prevail all over the states, they would start a new war and, therefore, the Americans had to be prepared for any contingency (Van Courtland Moon ,2006).

The American biological program was divided into two phases: the offensive program from 1945 to 1969 and the defensive one from 1969 until now. During the period of the offensive program, the policy of the USA concerning the use of biological weapons, despite the difficulties, relied heavily upon the provision of ‘‘no first use’’ of the Geneva Protocol of 1925. As it is already mentioned, the USSR was the great opponent of the USA. Until the end of the 1940’s, there were several patriotic voices even from military circles which claimed that the use of biological weapons was a matter of national security, as the communists could start a war in Europe and in Middle East and therefore the American toxin weapons could prevail over the soviet conventional weapons and since the toxic weapons cannot destroy buildings constructions therefore, after a conflict there is no need for urban reconstruction. At the end the policy which pursued by the American authorities was the ‘‘no first use’’ and the policy of retaliation (Van Courtland Moon ,2006).

A pivotal policy in the American policy was in the Korean War (1950-1953), when the USSR accused the USA of using biological substances against North Korea and communist China. The change of the policy did not come from President Truman but from President Eisenhower who would allow the use of ‘‘*chemical and bacteriological weapons in general war’’*. However, due to the financial burden of the biological program, as the biological agents were not used in any battle, the Americans considered the use of non – lethal substances but again this use could not be justified in domestic or international level. President Kennedy complicated the situation by using herbicides and riot control agents in Vietnam. Kennedy and later Johnson stated that they had not violated international law because the agents were not lethal (Van Courtland Moon ,2006).

On November 25th, 1969, President Nixon denounced the American biological warfare program and stated that biological research will be limited for defensive measures such as immunization. Moreover, he stated that he would submit in the Geneva Protocol and in 1975 the USA ratified the BTWC Convention (Van Courtland Moon ,2006).

4.2. Former Soviet Union

After the end of the WWII, USSR was the biggest enemy of the western states, mainly of America. At that time, there was a belief that the biological program of the Soviet Union was highly developed and that it possessed a large number of biological weapons. Even today, there is no clear state data on the biological program of the Soviets.

Biological experiments had already begun in the mid 1920s. In 1930, a research was carried out on botulism, plague tetanus and on the warfare methods. After the end of the war, former USSR had a limited range of biological weapons compared to other countries. In 1960, scientists expressed their concern about the underdeveloped soviet biological program and more specifically, about the lack of development in fundamental research in experimental and theoretical biology and there were no appropriate facilities (laboratories) and equipment (Hart, 2006). In 1972, the Politburo allowed the creation of the Ministry of Medico- Biological Industry which became the Main Directorate for Biological Preparations, known as Biopreparat. Despite the fact that, the USSR had signed the BTWC Convention, the Soviets, in order to take advantage of the progress of microbiology and biotechnology, they created this secret organization for the purpose of the production of biological weapons. In this way, the former USSR had in its possession a large stockpile of biological agents such as plague, anthrax, smallpox, glanders tularemia (Hart, 2006).

However, there was an accident which did not escape the attention of the international community and made known, despite the reaction of the Soviet side, the existence of the secret organization known to the western countries. In 1979, an outbreak of anthrax in Sverdlovsk occurred and 69 people died. The USA stated that people died as a result of a release of an agent from a biological facility. On the other hand, Soviets claimed that there was no biological release, but these victims ate contaminated meat. Then, suspicions began that the USSR violated international law. In 1992, President Yeltsin admitted that in Sverdlovsk there was an

aerosol release from a military facility, and he stated that the offensive biological program would stop. In 1994, the Soviet biological program stopped (Hart, 2006).

4.3. South Africa

The first time that the scientists of South Africa dealt with the biological agents, used in a war was during WWII, but this did not last long as the two laboratories in which the mustard gas was produced, closed in 1945. The biological program of South Africa began in 1981, but the reasons for its beginning date back to the mid 1970s. In 1975, South African troops invaded and tried to conquer, even though without success, Angola, which had just gained its freedom (Gould & Folb, 2000). During the hostilities, the South African authorities were informed that the Angolan troops would launch a chemical attack and so they decided they had to develop and acquire chemical and biological weapons in order to be able to counterattack.

However, at the same time apart from the external threat, the South African authorities had to deal with the internal reactions of the people as the latter protested against the policies of the apartheid regime. This country started its biological program in 1981 even though it was a member of BTWC and the Geneva Protocol and for this reason, the blueprint and the development of the program took place under strict conditions of secrecy (Gould & Folb, 2000).

The program ran through front companies and its military connection was concealed. The program, which was called ‘‘Project Coast’’, had defensive and offensive purposes. The main official reason for the program was to retaliate in the event that foreign forces launched a chemical attack on South Africa. However, the production of fatal toxins and pathogens undermined the living condition of individuals especially of the black Africans. Studies about the fertility of the black women were done as the scientists tried ‘‘*to prepare a contraceptive for women that could be administrated selectively and in such a way that the recipient would not know that she was taking it’’* (Gould & Folb, 2000). The chemical and biological program stopped after the apartheid regime and the program became known through the South African Truth and Reconciliation Commission in 1998.

4.4. Iraq

The information available on Iraq's biological program is not very objective as it has been provided by the country itself to the United Nations Special Commission (UNSCOM). This way the country's authorities were able to conceal important information as, indeed, Iraq stated that only a few persons knew about the program and that the latter should be developed in secrecy. Iraq had signed the Geneva Protocol 1925 but with even though one reservation: *''On condition that the Iraq government shall be bound by the provisions of the Protocol only towards those States which have both signed and ratified it or have acceded thereto, and that it shall not be bound by the Protocol towards any State at enmity with Iraq whose armed forces or the forces of whose allies, do not respect the provisions of the Protocol.''* (Pearson, 2006). In 1974, Iraq, as it felt threatened by its neighbors, Israel and Iran, wanted to make research based on chemistry, physics and microorganisms, however, without clarifying the exact nature of this research. The authorities of Iraq knew that neither Iran nor Israel had signed the BTWC, so they were potential enemies who could use biological weapons (Pearson, 2006).

The Iraqi biological program started in 1974 with the development and production of biological agents such as botulinum toxin, anthrax spores, aflatoxin and gas gangrene, which lasted with short breaks until the early 1990s. The dynamic of Iran's biological weapons became apparent in 1990 with the statement of Saddam Hussein ''*I say that if Israel dares to hit even one piece of steel on any industrial site, we will make the fire eat half of Israel*…''. After Iraq's invasion of Kuwait in 1990, an attempt was made to speed up the process of production and weaponization for the Gulf War. The UN Security Council Resolution 687 required from Iraq to destroy its weapons of mass destruction, equipment, and facilities under international supervision. Part of this demand has been met but there are still indications that all WMD have not been destroyed. The Iraqi biological program is considered as a program carried out with the utmost secrecy (Pearson, 2006).

5. Types of biological weapons

As it has already been mentioned, there are three types of WMD: chemical, biological and nuclear. ‘‘*A chemical weapon uses chemicals to kill living organisms; biological weapons make use of living organisms to kill; whereas nuclear weapons are atomic and hydrogen bombs with explosive yields’’* (Flora, 2019). According to U.S. Code Title 50, ‘‘War and National defense’’ the term *‘‘weapon of mass destruction means any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of toxin or poisonous chemicals or their precursors; a disease organism, radiation or radioactivity’’* (Croddy & Wirtz, 2005).

The biological weapons can be divided into three categories depending on which biological agents are used as key elements for their composition. The first type of biological weapon is the microorganism type in which viruses, bacteria, parasites, fungus are encompassed. The second one is the toxin weapon in which a natural toxin is used, which does not arise as a human creation but arises directly from the natural environment and it is more poisonous and simultaneously more lethal that a man – made toxin. The third and last one is the modified and genetically engineered toxins, which can become more resistant to vaccines and antibiotics, through chemical modification (Tu, 2017). This modification enables humans to create a countless chemically resistant toxins leading to an uncertain future for the protection of the civilians as bioterrorists can take advantage of this situation in order to cause panic. Biological weapons have a wide range of agents than chemical weapons (Tu, 2017).

Those who use biological weapons, have as their primary purpose to afflict the enemy as much as possible and they can do this in two ways, directly, by targeting human beings and, indirectly, by affecting the animals and the crops. At present, offensive programs which are related to the use of biological weapons have been banned, but defensive programs for research and peace purposes are allowed.

6. Types of biological agents

There are three categories of biological agents based on their ability to cause detrimental effects to living organisms. The first category includes high priority agents which have high levels of lethality and mass impact. The second category includes the moderate – priority agents which are not so detrimental and in the last category, the low priority agents which can be easily produced and used (Flora, 2019).

There is a great number of biological agents but there are four main categories of them which can be effectively used in a biological weapon (Cole, 2010). The first one incudes viruses such as plague, cholera, ebola, which can be multiplied in the host's body (Cole, 2010). The second group contains bacteria which are able to reproduce themselves and to produce bacterial toxins such as anthrax and typhoid, into the tissues of the body (Cole, 2010). The third category includes rickettsia which are bacteria, similar to viruses and can grow only inside the host body. The first carriers are insects and rodents. (Cole, 2010). The fourth and the last category comprises biological toxins, such as ricin (Cole, 2010).

Bacteria are defined as the smallest living organisms. They have simple cell structure and when the cultivation process takes place in a simple growth method, their reproduction happens by binary fission, separated into two (Nixdorff et al, 2004). Rickettsia is a bacterium as well, but it belongs to a different group. Rickettsia is dependent on the host factor; not capable to ''*synthesize co-factors needed for the activity of certain enzymes''* and they can only reproduce into the animals' cells (Nixdorff et al, 2004). Viruses are on the category of microorganisms, and they can infect the synthetic machinery of the cell of the host and produce a new virus because of the nucleic acid. The viruses, as well as rickettsia, use the cell of the hosts in order to develop (Nixdorff et al, 2004).

On the other hand, the toxins do not belong in the microorganism category. The toxins are produced from living organisms and especially the natural toxins can be more detrimental and poisonous from the synthetic toxin. For instance, the botulinum toxin is far more fatal ''*than the most poisonous nerve gas''*(Nixdorff et al, 2004). The toxins can not be reproduced on their own (Nixdorff et al, 2004).

7. Characteristics of biological agents

The ability of each biological agent to cause illness or to kill the host organism, depends on a lot of factors such as the environmental conditions or the way of life of the host, more specifically if he/she exercises and if the nutrition and the sanitation are proper (Flora, 2019). There are five crucial characteristics of the biological agents:

1. Virulence: the ability of a microorganism to cause illness which is not the same in all the living organisms.
2. Infectivity: the prowess of an agent to enter into the host and be multiplied and the rate of infection
3. Incubation period: the duration between the first exposure and the first symptoms in the body of the host
4. Lethality: the ability of the agent to kill the living organism which differs from one host to another as is the case with the virulence
5. Mode of transmission: if an agent needs a vector or not in order to find and enter to the host body. (Flora, 2019)

Biological agents can be dispersed through the air, they are able to get into to any area, as they can infect any living organism, human, animal and plants but, also, they can contaminate clothes, food and soil (Spiers, 2010). Countermeasures to the risk of biological agents, are vaccines, the use of protective clothing and collective strategic protective measures. As opposed to the rapid – acting nerve agents, the biological agents have an incubation period and as a result they act slower and the victim may show the symptoms much later after receiving the agent (Spiers, 2010). In case the biological agents are resistant to environmental changes such as the changes in temperature or the sun exposure, and manage to reach to their final target, dissemination could be done, not only through the air, but by human contact or through migratory birds (Spiers, 2010).

The success of the biological weapons is to cause heavy illness or psychological problems or even death and to be able to invade the victim in more than one way such as via lungs or from an open wound (Spiers, 2010). The biological agents can easily be transported in small quantities but are sufficient enough to cause disturbances such as in the case of murder or for

terrorist acts (Spiers, 2010). The biological agents can be found at a low cost, they are easy to be produced, they have high rate of lethality, they can be transmitted very quickly from person to person and the cure is not an easy task (Flora, 2019). The agents are very dangerous as, except from the future victims, also the workers in the laboratories face great danger until the final stage of delivery (Flora, 2019). Furthermore, it is hard for the scientists to keep the quality of the agents at a high level. Moreover, the agents cannot be controlled once released (Flora, 2019). The development of most of the microorganisms is a rapid process even when in small quantities. This fact is particularly worrying as the easy and quick process of development of biological agents, it can render them a significant ‘‘weapon’’ for terrorist biological attacks (Nixdorff et al, 2004).

The term ‘‘*pathogenicity*’’ is referred to the ability of a microorganism to cause disease and illness and, generally, has a negative meaning and detrimental consequences. There are several factors which can define the level of pathogenicity and how detrimental the latter can be in the host body (Nixdorff et al, 2004). There are three factors: offensive, defensive and several non-specific ones. Offensive factors are the substances of forms which are produced by the microorganism in order to invade into the living organism and provoke damage (Nixdorff et al, 2004). For instance, the adhesion molecules which help the microorganism to unite with the host tissues.

Defensive factors are the elements that come from the microorganism and help the latter to elude the immune system of the host (Nixdorff et al, 2004). An example of this, is the development of specific enzymes in order to damage the power of reactive oxygen compounds of the host so as not to kill the microorganism. ‘‘*Some non-specific factors include iron uptake mechanisms or molecular systems for transporting pathogenic factors out of bacterial cells’’* (Nixdorff et al, 2004). After many years of studies and experiments, yet the factors of pathogenicity are not crystal clear explained, because there is great amount of information, and so many aspects concerning the living organisms- hosts (Nixdorff et al, 2004).

8. Bacteria – Viruses – Toxins

8.1. Anthrax

The anthrax is a zoonotic disease, which means that people can be infected only whey they have daily contact with infected animals such as goats or sheep. More specifically, people who have an agricultural life or work in industries and deal with animal products such as wool and animal meat, have great possibilities to be infected (Veenema, 2018). The fact that anthrax comes from the animals is well known from the 19th century, as the anthrax disease was called ‘‘wool sorters disease’’, and it was detected to people who worked with the wool of animals. The bacterium can not be disseminated from person to person. Anthrax is a spore forming bacterium which is called *Bacillus anthracis.* The spores can remain active for decades and are resistant to high temperatures as well as to ultraviolet light (Veenema, 2018). There are four types – forms of anthrax: gastrointestinal, meningeal, inhalational and cutaneous. The anthrax is extremely fatal when there is no proper medicine cure as it emits very strong toxins (edema and lethal toxin). The incubation period is about 1- 13 days for inhalational anthrax and about 3 - 5 days for gastrointestinal anthrax (Weinstein & Alibek, 2003).

Some of the common symptoms are high fever, cough, tiredness (inhalational) and anorexia, vomiting, high fever (gastrointestinal). The diagnosis of the anthrax disease is made via the ‘‘*clinical presentation, laboratory analysis and radiographic findings’’* (Weinstein & Alibek, 2003). The treatment is based on antibiotics and vaccines, but it depends on the type of anthrax, and it lasts about 60 days. In 1970, the WHO stated that if there had been an airborne release of 50kg of anthrax in a city of 5 million citizens, 250.000 would have been infected and 100.000 would have been dead without any cure (Veenema, 2018).

8.2. Botulism

First of all, botulism is a disease transmitted by contaminated food. The illness is caused by a neuroparalytic toxin which is produced by the bacterium *Clostridium botulinum* This

bacterium can be found mainly on the surfaces of food, in soil and in dust. Botulism toxin is the most fatal toxin for the humankind, as less than 1 microgram is a deadly dose for a person (Veenema, 2018). The transmission from person to person is not possible. Even though this toxin is rare, it can provoke such a chaos and it can cause health problems to a large number of the population, especially if it is difficult for the authorities to find its source. Because of its risk and the disaster that it is able to cause, botulism is an ideal material for terrorist attacks (Weinstein & Alibek, 2003). The first documented reference of this disease was in 1897. However, in recent history, this toxin was important for the biological programs of some countries such as the United States of America, the former USSR and Iraq (Veenema, 2018).

Despite the fact that botulism is extremely fatal for humans, the medical society succeeded in finding a positive side and therefore botulism is now used for the treatment of cervical torticollis, and other musculoskeletal problems and in plastic surgery (Botox) for the elimination of the wrinkles. The incubation period is approximately 18-36 hours after the ingestion, but it can last for days. Some of the symptoms are dysphagia, blurred vision, hoarseness and the victims have no fever. If someone gets infected from botulism disease, he/she must ask for medical care, otherwise consequences might be harmful. When the toxin enters the human body, it provokes paralysis of the cranial nerves and this paralysis may extend to the respiratory musculature with the detrimental result of respiratory failure and finally stage, death. The medical therapy of botulism includes ventilatory support and botulinum antitoxin (Veenema, 2018).

8.3. Plague

Plague is the most well-known disease because it was the nightmare of all Europeans in the Middle Ages (back then it was called as the Black Death), causing anxiety and fear. The toll was 40% of European citizens infected and 200 million dead. Plague is caused by the bacterium *Yersinia pestis*. During the Cold War, the USA and the USSR tried to weaponize the disease of plague. The plague is transmitted mainly through the bite of infected fleas and through the droplets that an infected person can transmit to another.

The disease has three forms: bubonic, pneumonic and septicemic. (Veenema, 2018). The first one, the bubonic, is the most common dating back from the Middle Ages until now.

Whoever gets sick from bubonic, must endure the pain of the swollen lymph nodes, followed by bacteremia. Far as the septicemic plague is concerns, fleas are again responsible for its and those who get sick develop sepsis resulting to organ dysfunction. The last one, the pneumonic plague is transmitted though infected human droplets causing pneumonic problems. Concerning the bubonic, unless the patient receives a treatment, the mortality level reaches 50% and most of these cases end up to septicemic plague. In the case of pneumonic, if there is no medical treatment and, the mortality is almost in 100% (Veenema, 2018). The incubation period is approximately 2 to 10 days. Some of the symptoms of the bubonic include pain in the lymph nodes, high fever and headache. Symptoms for the pneumonic include chest pain, dyspnea and hemoptysis. The treatment is based on antibiotics, however, in the case of the pneumonic, there must be advanced medical therapy (Weinstein & Alibek, 2003).

8.4. Smallpox

The smallpox is a DNA virus, caused by the *Variola major*, which is the most fatal form of the disease, and by the *Variola minor*. In 1980, the WHO stated that the disease of smallpox was eliminated and that happened because of the international vaccination program against the virus. The first documented reference of the virus was recorded during the French and Indian Wars (1754- 1767), when the British offered smallpox infected blankets to American Indians. The last incidence was recorded in Somalia in 1977. After 1980, the WHO proposed the remaining stockpiles of smallpox to be destroyed. After negotiations, in May 2002, the WHO decided that the Variola virus will be examined and used only for research purposes (Veenema, 2018).

This virus has extremely high rates of transmission from person to person and this happens in two ways, by the droplets of infected people and by exchanging infected objects such as clothes or blankets (Weinstein & Alibek, 2003). The virus is resilient as it can remain for many months onto infected objects. The main way that the virus can enter the human body is the respiratory tract. The incubation period ranges from one to two weeks during which the patient does not have any kind of symptoms. After this period, the patient suffers from headaches, high fever and only later does, the rash of smallpox come on the surface. This rash appears on the face and extremities and affects the palms and soles. The toxicity of the virus may cause the death of humans. Whoever gets infected from the virus, must isolated himself and the contacts

of the patients must be vaccinated and be under surveillance. The treatment of the virus is based on supportive medical cure, antibiotics, and pain medications (Veenema, 2018).

8.5. Tularemia

Tularemia is a zoonotic illness, and is caused by the bacterium *Francisella tularensis*. The first incidence of the disease was in 1914. During WW II, a great number of soldiers were sick from tularemia and during the Cold War, the USA and the former USSR had in their possession stockpiled stores of the bacterium. Tularemia has extremely high levels of infection, it can cause even death if there is no medical treatment and that is why it is a potential biological weapon for terrorist groups especially in the form of aerosol (Weinstein & Alibek, 2003). The common hosts of tularemia are animals such as the rabbits and the rodents and the transmission to human can happen in many ways: via the bite of infected ticks, via contamination of infected meat or water, the contact with infected animals and through inhalation. The first symptoms are fever, sore throat and headache. Among to human organs affected by the bacterium are the spleen, the liver, the kidneys and the lungs. If there is no treatment, it may cause bronchopneumonia and respiratory failure and, in most of the cases, death. The treatment is based on antibiotics (Veenema, 2018).

8.6. Salmonellosis

There are two diseases regarding salmonellosis, the typhoid and the paratyphoid enteric fevers and each caused by two bacteria, the *Salmonellosis typhi* and the *Salmonellosis paratyphi*. Salmonella can be found anywhere across the world. These two bacteria have a high level of resistance against the antibiotics and that is why they are appropriate for biological attacks. The mortality level reaches 10 – 30%, if there is no timely treatment. The incubation period for enteric fever is 5 – 21 days. The infection happens by the consumption of contaminated water or food. The transmission from human to human occurs by contact. The first symptoms of typhoid or paratyphoid fever are diarrhea or constipation. After a few days, high fever, weakness, cough and sore throat will make their appearance. The appropriate cure is the supportive treatment without antibiotics and the approximate period for the cure for enteric fever is 10 – 14 days (Weinstein & Alibek, 2003).

8.7. Viral Hemorrhagic Fevers

Viral Hemorrhagic Fevers (VHF) are febrile diseases caused by RNA viruses from viral families. These viruses are very contagious, and can cause even death. In 2002, the Working Group on Civilian Biodefense stated that VHF, apart from the fact that they are difficult to be developed and they are required experienced personnel to deal with, they can also be used as biological weapons because of the high morbidity rates, transmission and the catastrophic consequences that they can cause to humans. Aerosol is the best way for the diseases to spread (Veenema, 2018). The dissemination of the diseases happens mainly via the contact with infected animals.

8.8. Ebola

Ebola is a virus which it belongs to the group of Filoviruses. It is the most devastating disease as it has high mortality rates (90%). Several epidemics, regarding the Ebola virus, have occurred. The largest one was in West Africa and more specifically in Guinea, Sierra Leone and Liberia from 2014 to 2016 (Veenema, 2018). The toll of the outbreak was 28.000 cases and 11.000 deaths. Russia, concerning its biological program, weaponized the Ebola virus and there are rumors that Iraq did the same. The incubation period is approximately one week but it can be expanded to 21 days (Weinstein & Alibek, 2003). Transmission from person to person is possible but is rare. The common symptoms are similar to common flu such as fever, weakness, cough and sore throat. However, the disease can provoke renal insufficiency and death. A vaccine is available for the cure of Ebola (Veenema, 2018).

8.9. Lassa Virus

Lassa virus is included in the group of Arenavirus. Lassa virus is considered a typical disease in Western Africa, as every year 100.000 to 300.000 persons are infected. In 2010, there were cases of the virus in the USA. Dissemination is occurred mainly by contact with rodent and hosts are usually the farmer workers (Veenema, 2018). The mortality rate of the virus reached 15 – 20%. The incubation period lasts 3 – 16 days and the period of illness lasts approximately one week with chest and back pain, vomiting, cough, fever (Weinstein & Alibek, 2003).

8.10. Rift Valley Fever

The root cause of the Rift Valley Fever is the virus of the group of Bunyaviridae. Despite the fact that the mortality rates are less than 1%, the virus can be an effective biological weapon for terrorist groups and especially an aerosol attack. Apart from the infection of the human body, the virus can be destructive in the agricultural sector and more specifically it can be fatal to the farm animals. The mosquitoes are those who transmit the virus, and the symptoms are fever, asthenia, back pain. On some occasions, there can be extensive bleeding and even death. There exists a vaccine, experimental but promising one (Weinstein & Alibek, 2003).

8.11. Yellow Fever

The source of yellow fever is the Flavivirus family. The virus is transmitted via the tick bite and there is evidence that via inhalation the virus can enter the host. In South Africa, the yellow fever is a great opponent for the medical staff as in this part of Africa there is not adequate medical equipment and vaccines to defeat the rapid spread of the disease. Specifically, in 2013, WHO stated that 84.000 to 170.000 persons are being infected per year in Africa and in 2017 in Brazil, 230 cases and 80 deaths were recorded (Veenema, 2018). The mortality rate is 8% but it can reach 50%, *if ‘‘the hemorrhagic develops’’* (Weinstein & Alibek, 2003). The incubation period is 3 to 6 days, and the symptoms are vomiting, high fever, myalgia. The virus

can provoke arrythmias, renal insufficiency and death 10 days after of the infection. Vaccines against the virus are ready and tested.

9. Humanitarian law

It is crucial to mention the importance of customary international humanitarian law regarding the rules of warfare, before analyzing the declarations and conventions for the prohibition of biological warfare. The law of war, or the law of armed conflict or as it is called today the international humanitarian law involves a set of rules that applies when a warfare is unfolding. The humanitarian law, the rules of which have customary origin, is part of public international law. The rules and principles of humanitarian law are based on international convention and customary rules and are used when an armed conflict takes place, whether international or not, and are aimed at resolving problems of a humanitarian nature. The main task of this law is the protection of the civilian population who are not involved in the armed conflict but also those who have been injured and are unable to participate in the fighting. In addition, this law tries to limit states' choices regarding the methods of warfare in order to avoid destructive situations (Μαρούδα, 2015).

The term ''humanitarian law'' was firstly used in the Geneva Conventions in 1949 and in two additional Protocols in 1977 in which the humanitarian character of the rules was emphasized. However, the terms ''law of war'' or ''law against war'' or in Latin language ''jus in bello'' have their origin to the Hague Protocols and Conventions of 1899 and 1907 and they were used to set out the rules and the customs during an armed conflict. The law of Hague refers to the rules of the warfare methods, the occupation and neutrality and the law of Geneva includes the rules about the protection of the unarmed civilians, the injured ones and the hygienic services (Μαρούδα, 2015).

The basic principles of international humanitarian law apply to all types of warfare regardless of how it is attempted, by land, sea, or air. It is not about the basic rules of compliance during a warfare, are adopted and instituted by the advanced states as national law and derived mainly from customary law, but it is about the specific and targeted principles which are applied either independently or in an interpretative manner and define the limits of

law and its violation by each commander in any military intervention. These principles can be interpretive, competing, or complementary (Μαρούδα, 2015). The basic principles of the humanitarian law are the following:

9.1. Principle of distinction

The principle of distinction is the most important and fundamental out of the four principles of the international humanitarian law. The principle of distinction requires the opposing warring parties during their military interventions to distinguish the military from the political target (Μαρούδα, 2015). The military target includes the enemy's military installations and infrastructure as opposed to the political target which includes the civilian population of the area, its service centers as well as its cultural heritage. There are weapons, the use of which, in the first place, is prohibited in humanitarian law because they do not have the ability to aim with absolute accuracy at the desired target with the result that, even if there is a will for the rules of humanitarian law to be applied, it could not be possible because of the uncontrolled character of these weapons (Μαρούδα, 2015). Thus, for instance, the use of cluster munitions or biological and chemical weapons by any warring party is prohibited because these weapons indiscriminately hit both military and civilian targets and the detrimental effects can not be curtailed once they are released.

It is possible for the rules of humanitarian law to be violated even when a weapon the use of which can be controlled, is used purposefully to cause widespread damaging effects on political targets such as the unarmed civilians and their service infrastructure rather than to hit military targets. Thus, in any case, once the stigma of the military goal has been established, all the necessary actions and choices must be made so that only this goal can be achieved exclusively (Μαρούδα, 2015). This is considered international permissible military action. There are international warfare cases, which have given case law convictions for operations committed in violation of the principle of distinction by attacks on political targets. Recent case law from the International Criminal Court in 2000 for former Yugoslavia shows that there was violation of the principle of distinction when in practice the targeting of the civilian population was intentional and in the knowledge of the warring party.

In this case, not only deceit is included, that is when the warring part knows that by its action it violates the law but also possible deceit, that is when the warring party knows that there was a possibility among the strategic goals of hurting civilians (Μαρούδα, 2015). It was considered that the accused who acted without distinction between the fighters and the civilians violated the principle even in the presence of a limited number of fighters within the civilian population. Another case which raised great concern about the violation of the principle of the distinction between the civilians and combatants was the bombing of the Al Firdos Camp during the first war in Iraq in 1991. This camp was a military target, and it was considered as meeting place for the group of Saddam. It was bombed at night and the following morning 204 bodies of civilians were retrieved (Μαρούδα, 2015).

9.2. Principle of humanity

The principle of humanity derives mainly from customary law and is opposed to the customary principle of military necessity. However, these two principles, while in their sense are opposite, are directly connected with each other because they constitute the limitations of the methods and means of warfare (Μαρούδα, 2015). Regarding the principle of humanity, based on the article 35: *1) ''in any armed conflict , the right of Parties to the conflict to choose methods or means of warfare is not unlimited, 2) it is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering, 3) it is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long – term and severe damage to the natural environment''* (Μαρούδα, 2015).

9.3. Principle of military necessity

The principle of military necessity concerns the necessary measures that every commander must take in order to succeed in his military operation that he undertakes, as long as the target is legitimate and belongs to the military prefectures. The permissible or impermissible military actions are not explicitly defined by rules of law (Μαρούδα, 2015). The characterization of a

target as military or political is the main factor for the determination of the necessity. ‘‘*If there is doubt, this target can not be hurt. The military necessity is not defense for war crimes’’.* (Μαρούδα, 2015).

According to this principle, the relation between the expected military advantage and its importance in relation to the losses among the citizens, is examined proportionally. The principle is codified in article 572A of the international humanitarian law which stipulates that the commanders must make every effort to be aware that the chosen military targets are neither private, nor objective, nor civilian (Μαρούδα, 2015). Furthermore, the commanders must take all possible measures to ensure human resources and political goals, to make the most correct decision during the military intervention which will lead to the smallest possible number of human losses. If at any time during the operation, it is clear that the target is not military, the attack must be postponed or canceled. A typical case is the atomic bomb in Nagasaki in Japan where, measuring the loss of human lives and the general harmfulness of the weapon the ,military attack was not legal, regardless of the fact that the weapon in Nagasaki led to a complete military success (Μαρούδα, 2015). This principle is based on customary law and its limits are determined mainly by the principle of discrimination.

9.4. Principle of precautions in attack

The principle of precaution during the attack is based on customary law and is addressed to both parties to the conflict at the same time, for the protection of the civilian population. In this case, during the attack, the parties must ensure that, the targets must be only locations with strategic advantages, they will make use of the necessary and approved weapons, will not be located in the areas of the civilian population and the defending party must remove the population living and working near a military target (Μαρούδα, 2015). That means that the defending party should avoid using the civilian population as a shield of protection. These are also described in Articles 57 and 58 of the Protocol of 1977 and at the same time the precautions for attack and defense are explained in a period of initiation of conflict, initiation of armed intervention both for the attack and for the defense respectively in Article 7 and 8 in the second Protocol of the Hague Convention 1954 (Μαρούδα, 2015).

10. Prohibition of biological weapons in international law

According to customary international humanitarian law *''the use of biological weapons is prohibited''.* Due to the unpredictable and uncontrollable nature of biological weapons as well as the destructive consequences which may be provoked within the population, the animals, and plants all being possible – future victims, the existence of biological weapons is a major obstacle to world peaceful living conditions and the use of these kind of weapons is contrary to the principles of the customary international humanitarian law. More specifically, the use of biological weapons, by the military forces - perpetrators is against the principle of distinction. Once the biological agents released, they can not be controlled having as a consequence that soldiers and non-armed civilians might be infected, without distinction between military and political targets. Furthermore, the biological weapons are against the principle of humanity as the victims of biological agents may suffered from physical pain to psychological problems. Moreover, biological weapons can cause major problems in the natural environment. In addition, the use of biological agents is against the principle of precautions in attack as the agents can not target only military installations and they can be transferred via the air and disseminate a lot of persons who are not involved at the battlefields.

11. International Conventions

The basis of international humanitarian law is the customary norms which were used by the military forces in any armed conflict over the ages. The main point of the ''laws and customs of war'' is the avoidance of inappropriate and dishonorable practices mainly by military forces against civilians. However, these rules were not always followed by everyone. The origin of these customs is the Lieber Code which is composed by Francis Lieber during the American Civil War in 1863 (Jean – Marie & Louise, 2005). The Lieber Code is the first document on the rules of war, it affected many conventions related to war and many state regulations. The Code was presented in 1874 in the Brussels Conference but there was no binding treaty (Jean – Marie & Louise, 2005). Its rules together with the Oxford Manual in which the proposal for the prohibition of using poison in any form was also included, basically used for the Hague Declaration and Convention in 1899 and 1907 (Zanders,2003).

The Hague Declaration (IV,2) in 1899, was the first declaration which was about the prohibition of using ‘‘*asphyxiating and deleterious gases’’*. The Declaration was ratified by 33 State Parties. Efforts to reduce hostilities and atrocities that could occur in a war, continued in 1907 with the Hague Convention (IV). The Convention was about the laws and customs of war on land. According to Article 4, the Hague Declaration remains in force for the State – Parties which did not ratified the Hague Convention. During WWI, the states did not adhere to the Declaration and the Regulations of the Hague Convention, as there was extensive use of chemical weapons. After the war, there was a need of one more international convention concerning the biological weapons. On June 17, 1925, the Geneva Protocol was signed, it was about the prohibition of asphyxiated, poisonous weapons and for the first time the bacteriological methods of warfare were banned. Nevertheless, the Geneva Protocol did not prohibit the development, production, and the retention of biological weapons. This omission created the impression that the protocol would not be effective.

After WWII, in 1948, the UN Commission on Conventional Armaments gave the first definition of the WMD (Carus, 2012). The biological weapons along with chemical, radioactive, and atomic explosive weapons which can cause detrimental effects in the future, were defined as WMD (Carus, 2012). The humanitarian law, which is about the rules of armed conflicts, was created by the Four Geneva Conventions in 1949 and their Additional Protocols of 1977 (Μαρούδα, 2015). This law provides protection to those who are not involved in the armed conflict (the unarmed population) or who are unable to participate in the conflicts such as the sick persons, the wounded or the captives (Μαρούδα 2015). Furthermore, the law tries to reduce the detrimental warfare methods during an armed conflict (Μαρούδα, 2015). The ruinous effects of the biological warfare were issued in 1969, as the UN published a document which is focused on the detrimental consequences which can be provoked by the unpredictable nature of the chemical and biological weapons (Goldblat, 1997). These consequences will have an impact on humans and the environment and will affect both the victims of these weapons and those who release the biological agents (Goldblat, 1997).

A year later, the WHO published a report which emphasized on the negative and uncertain effects of the biological weapons to human health (Goldblat, 1997). In 1960s, there was, mainly from the Western countries, the wish for the establishment of one treaty in which the biological weapons would be prohibited (Goldblat, 1997). The Soviet and the neutral countries did not recognize the need of the treaty which would be exclusively for the prohibition of these

weapons but eventually they agreed with the western states (Goldblat, 1997). The decision of the USA played an important role in this change, as in November 25, 1969, President Nixon renounced the biological offensive program of his country and stated that stock of the biological agents would be destroyed independently of the existence of an international convention (Goldblat, 1997). On February 14, 1970, the USA renounced officially *the production, stockpiling and use of toxins of war purposes* and the biological agents would be used only for research and defensive purposes (Goldblat, 1997). After several negotiation meetings concerning the prohibition of biological weapons, on 16 December in 1971 the General Assembly approved the text of the international treaty which was composed by the Conference of the Committee on Disarmament (Goldblat, 1997).

11.1. Geneva Protocol

The atrocities, the cruel conditions, and the extensive use of chemical weapons during WW I, showed lack of effectiveness of the Hague Declaration (1899) and Convention (1907) about the prohibition of asphyxiated gases. In order for the prohibition to be strengthened, the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare or the Geneva Protocol was signed on June 17, 1925. There are 145 State Parties and the most recent is Kyrgyzstan which acceded to the Protocol on June 29, 2020. Apart from the prohibition of the use of poisonous gases, the Protocol, for the first time, focused on the ban of the bacteriological methods of warfare. Furthermore, the text mentions that these asphyxiating gases must be denounced by the civilized world and that all nations must respect this rule as part of International Law. Moreover, the Protocol urges the State Parties to persuade other states to accede to and adopt the text (Geneva Protocol, 1925).

However, the Protocol has some weaknesses which were not unnoticed at the time when the text was drawn up. One of the weak points of the text is that the prohibition of biological and chemical weapons applies only to the State Parties. Many states made reservations regarding their right to use this kind of weapons against non – parties and the right to retaliate

against the countries which would release biological agents first (Scharf, 1999). The second weakness is that the Protocol does not prohibit testing, stockpiling, production and design of chemicals and biological agents giving thus to some states the idea that they have the freedom to develop biological programs, so, as to be ready in case of retaliation (Scharf, 1999). In addition, according to the text, the prohibition of these weapons applies only in wartime and there is no reference regarding peacetime. Furthermore, there are no verification provisions as no group of experts can not investigate if any State – Party violates the principles of the Protocol (Scharf, 1999). Another weaken is that there is no mention about the internal use of biological and chemicals weapons by a government to its own citizens. Thus, the Protocol could not fulfil its purpose effectively, to prohibit the use of chemical and biological weapons, as there were several weaknesses (Scharf, 1999).

11.2. Biological Weapons Convention 1972

The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction is one of the most important conventions concerning the rules of conduct in a warfare. More specifically, the convention bans the use of biological and toxin weapons because they are, in a great level, fatal weapons and they can provoke detrimental consequences to public health. Precursors to this Convention were the Regulations in Hague Convention IV, 1907 in which the use of poison or poisoned weapons was banned and the Geneva Protocol, 1925 in which the idea of using chemical weapons in a battlefield was disapproved because of the hostilities during World War I. ‘‘*The Convention is complementary to the Protocol, prohibiting the development, production, stockpiling, acquisition, retention and transfer of bacteriological weapons and requiring their destruction’’* (ICRC,2019).

The prohibition of this kind of weapons makes clear that the States have no right to use every weapon that they want. The Convention was outlined during the Conference of the Committee on Disarmament and adopted by the United Nations General Assembly. The Convention was opened for signature on 10 April 1972 in London, Washington and Moscow.

It entered into force in March, 1975 and it is binding on the majority of the states. The objective of the convention is to accomplish the complete disarmament of the states from biological weapons and the elimination of stocks of dangerous biological substances in order not to be used in any circumstance as weapons (ICRC,2019). This Convention has 183 States Parties and Tanzania became the last country to accede to the treaty.

The BTWC, 1972, is the first international convention to prohibit the use of all the biological weapons. The essence of the Convention is the general prohibition of possession and use of biological agents for non – peaceful reasons and the only thing that is permitted is the development of biological agents only for peaceful, protecting and defending reasons against biological acts. The fact that, there is the option of the development of biological agents, even for peaceful purposes, will always be a great danger, as the States, the military, the scientists can use any time they want the new technologies and new techniques, and new threats could be raised because of a looming biological warfare. Because of political difficulties and because of the general idea that the biological agents are not practical in the military issues, during the negotiations, there were no verification measures or complaint resolution processes. The biological agents are not suitable to be used in the battlefields because of their unpredictable character (Nixdorff, Schlling, & Hotz, 2004)

More specific the biological agents are dependent on the meteorological changes such as the temperature and the most important is when a biological agent is released, it is very difficult to be controlled and restricted into one area. However, the destructive and unpredictable consequences of the biological weapons did not constitute a significant obstacle for some countries to develop offensive biological programs. Russia developed offensive biological program from 1946 to March 1992 and the UNSCOM discovered that after the Gulf War (1990-1991), Iraq had a large amount of biological ammunition. Concerning the production and the development of the biological weapons, in recent times the biotechnology held a crucial role (Nixdorff, Schlling, & Hotz, 2004).

11.2.1. Article I

''Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:

(1) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;
(2) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.''

In Article I of the Convention, there are some weak links as there is no clarification as to what the prohibited substances are, and also the targets that should be protected from a biological attack are not defined. In 1970, the WHO published a document with the definition of the biological agents. *''Biological agents include those that depend for their effects on multiplication within the target organism and are intended for use in war to cause disease or death in man, animals or plants''* (World Health Organization, 1970). In the article, it is mentioned that the toxins are prohibited, irrespective of their origin or method. So, the article covers all the methods of toxin production, biological and chemical production. This reference to toxins as prohibited substances, led to the prohibition of chemical weapons in the period between 1993 to 1997. Although, there were no definitions of the biological agents and toxins, there were not any state disagreements or objections (Goldblat, 1997).

However, the lack of definition of *weapons, equipment or means of delivery*, was sufficient to create disagreements and doubts. When Switzerland ratified the BTWC, took advantage of this lack of definition, and made a reservation which was about its right to decide which weapons, equipment and means of delivery are capable to use biological agents and toxins. The USA objected to this reservation and stated that it would not be proper and effective for each country to decide on its own which weapons are considered able to use biological agents and claimed that the design of the biological weapons is specific without any doubt and that the latter have only one detrimental purpose. Furthermore, in this Article, the issue of the prohibition regarding the production, development, stockpiling, acquirement and retention of the biological agents and toxins is not crystal clear. The prohibition refers only to the cases

where there is no justification for any *prophylactic, protective or other peaceful purposes* (Goldblat, 1997).

At no point of this Article is, the quantity of these banned substances, specified and this is a significant default as the production and retention of biological agents and toxins is allowed for their use in special laboratories. Moreover, it is not mandatory for the states to make an official statement about the types and the quantities of biological agents that they have in their possession. The distinction between the research on biological substances for peaceful purposes and for military purposes, is very difficult to be made. The fact that the biological agents when developed for peaceful purposes could be used in a battlefield, poses a great risk for the violation of the objective values of the Convention. After several negotiations, the term ‘‘*prophylactic’’* is referred to the medical assistance such as the *diagnosis, therapy, and immunization* (Goldblat, 1997). The term ‘*‘protective’’* is referred to the decontamination equipment such as the air and water filtration systems and protective masks and clothes. The term *‘‘protective’’* must not be construed as allowing the possession of detrimental biological agents for defensive purposes or for retaliation. The term ‘‘*other peaceful purposes’’* have not been explained so far (Goldblat, 1997).

11.2.2. Article *II*

> *‘‘Each State Party to this Convention undertakes to destroy, or to divert to peaceful purposes, as soon as possible but no later than nine months after the entry into force of the Convention, all agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, which are in its possession or under its jurisdiction or control. In implementing the provisions of this Article all necessary safety precautions shall be observed to protect populations and the environment’’.*

In the Article II, lies the core essence of the Convention. The states are obliged to destroy their biological weapons or to divert them for peaceful reasons. Concerning the period of nine months for the destruction of the biological agents or the transformation of the latter into substances for peaceful purposes, the Review Conference (2016) stated that any state which wants to enter the Convention, should have already completed the process of destruction or

conversion. The USA was the only country which stated that it destroyed its stocks of biological weapons before the Convention (Goldblat, 1997). In addition, United Kingdom stated that it did possess biological agents as Soviet Union but its statement of not possessing biological weapons was untrue. Although, the Convention mentioned that the period of destruction is nine months, the Review Conference stated that any State which wish to join to the Convention, it must fulfill this obligation at the time of joining (ICRC,2019).

11.2.3. Article III

''Each State Party to this Convention undertakes not to transfer to any recipient whatsoever, directly, or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, toxins, weapons, equipment or means of delivery specified in Article I of the Convention''.

In this Article, the dynamics of the ban on biological weapons becomes stronger as the ban applies not only to development, production and use but also to their transport from country to country. The Convention covers the full range of potential perpetrators as not only states are capable of using biological agents as weapons, but also international organizations and non – state groups such as terrorist groups (Goldblat, 1997).

11.2.4. Article IV

''Each State Party to this Convention shall, in accordance with its constitutional processes, take any necessary measures to prohibit and prevent the development, production, stockpiling, acquisition or retention of the agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, within the territory of such State, under its jurisdiction or under its control anywhere''.

The Review Conference (2016) requested that all State parties must take all appropriate measures in order to adapt their national legislation to comply with all the Articles of the Convention and to prevent acts which can be in contrast with the principles of the Convention. The term *''measures''* is referred to the administrative and legislative measures of a state (Jozef, 2002). More specifically, one State is following the provisions

of the Convention, only when the State party passes laws and takes the appropriate measures which are in accordance with the Articles of the Convention (ICRC,2019). Moreover, the States are responsible for the scientific laboratories so that analyzes and experiments will not be performed on materials which are prohibited (ICRC, 2019). Furthermore, the States must ensure that the medical and military programs are in compliance with the provisions of the 1925 Protocol and the Biological Convention. In addition, the States should have penalty laws in order to prevent and discipline those who do not abide by the national and international law. The term *''under its jurisdiction or control''* is referred to, non-self - governing territories which are under the control of State Parties or is referred to territories which are under military occupation (Jozef, 2002).

11.2.5. Article V

''The States Parties to this Convention undertake to consult one another and to co-operate in solving any problems which may arise in relation to the objective of, or in the application of the provisions of the Convention. Consultation and co-operation pursuant to this Article may also be undertaken through appropriate international procedures within the framework of the United Nations and in accordance with its Charter.''

In this Article, the idea of state cooperation is promoted, with the aim of protecting the principle of the Convention through international procedures. However, ''the international procedures'' are unknown as the Convention does not make any clarification. Review Conference (2016) reached an agreement according to which any state has the right to call for a meeting, consisting mainly of scientists, which will be open for all member states (Goldblat, 1997).

11.2.6. Article VI

(1) ''Any State Party to this Convention which finds that any other State Party is acting in breach of obligations deriving from the provisions of the Convention may lodge a complaint with the Security Council of the United Nations. Such a complaint should include all possible evidence confirming its validity, as well as a request for its consideration by the Security Council.

(2) Each State Party to this Convention undertakes to co-operate in carrying out any investigation which the Security Council may initiate, in accordance with the provisions

of the Charter of the United Nations, on the basis of the complaint received by the Council. The Security Council shall inform the States Parties to the Convention of the results of the investigation''.

When a state accuses another state of using banned substances and violates the Convention, the accusations must be based on sufficient evidence and not on inaccuracies. If there is no proof of the violation, the Security Council rejects the accusations. Nevertheless, it is possible for a state of no great power to discern and acknowledge a violation of another more powerful state but, due to weakness or reluctance, never to lodge a formal complaint (Goldblat, 1997).

11.2.7. Article VII

''Each State Party to this Convention undertakes to provide or support assistance, in accordance with the United Nations Charter, to any Party to the Convention which so requests, if the Security Council decides that such Party has been exposed to danger as a result of violation of the Convention''.

The term ''*assistance''* means any act that has a medical or humanitarian character. Each state decides for itself whether it provides assistance to another state. The aid is not mandatory and if not provided, it is not considered a violation of the treaty.

11.2.8. Article VIII

''Nothing in this Convention shall be interpreted as in any way limiting or detracting from the obligations assumed by any State under the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925''.

One of the problems of this Article is that some of the states that have signed the Biological Convention are not at the same time members of the Geneva Protocol and this fact creates some difficulties. The other problem is that as long as the rules of the Protocol apply, the reservations remain for certain states concerning their right to be able to use prohibited weapons when another state has violated the Protocol or in case of retaliation. This reservation is against to the Article I of the Convention which states that any state ''in any circumstances'' must have

in its possession biological weapons. Some states have expressed their concern but also their desire to eliminate any possibility of using biological weapons. In 1984, China expressed the opinion that it is time for an exclusive prohibition concerning the use of biological weapons to be applied. Over the years, many countries have withdrawn their reservation to the Geneva Protocol (Goldblat, 1997).

11.2.9. Article IX

''Each State Party to this Convention affirms the recognized objective of effective prohibition of chemical weapons and, to this end, undertakes to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling and for their destruction, and on appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapons purposes''.

The fact that there is a whole article in the biological convention for the promotion and the conclusion of an international agreement on the prohibition of chemical weapons, shows that the latter are considered as dangerous as the biological ones. The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction entered into force on April 29, 1997.

11.2.10. Article X

(1) ''The States Parties to this Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. Parties to the Convention in a position to do so shall also co-operate in contributing individually or together with other States or international organizations to the further development and application of scientific discoveries in the field of bacteriology (biology) for the prevention of disease, or for other peaceful purposes.

(2) This Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or

international co-operation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) agents and toxins and equipment for the processing, use or production of bacteriological (biological) agents and toxins for peaceful purposes in accordance with the provisions of the Convention''.

The States are requested to share information about their biological research programs and their scientific laboratories. Furthermore, the idea of contact between the scientists is promoted and the publication of the results of the biological research is encouraged. The scientific discoveries will be used for peaceful purposes and for the prevention of diseases. Moreover, it is important that the States to declare their vaccine production facilities. However, this Article does not comply with the Article III which prohibits the transfer of biological agents between countries and international organizations. For the prevention of situations that could lead to the transport of fatal substances for the development of biological weapons, an informal forum known as the Australia Group was created (Goldblat, 1997).

This Group is responsible for controlling the substances which are transported. Many states considered this group to be complementary to the Convention as it could prevent the use of substances in becoming weapons. Contrary to the above, there are countries which believe that this Group operates favorably to the developed countries, and they would like the export controls of the biological agents to be based on legal documents. This gap was also evident to the BW Conference Review Conference as it was realized that all the countries are not in the same level in the fields of biotechnology and genetic engineering (Goldblat, 1997).

11.2.11. Article XI

''Any State Party may propose amendments to this Convention. Amendments shall enter into force for each State Party accepting the amendments upon their acceptance by a majority of the States Parties to the Convention and thereafter for each remaining State Party on the date of acceptance by it''.

In 1996, Iran proposed for the title of the Convention and the Article I to be amended in order for the prohibition of biological weapons to become more clear. Many of the State Parties did not follow the proposal of Iran because they were afraid that many requests for reconsideration of other provisions would follow (Goldblat, 1997).

11.2.12. Article XII

''Five years after the entry into force of this Convention, or earlier if it is requested by a majority of Parties to the Convention by submitting a proposal to this effect to the Depositary Governments, a conference of States Parties to the Convention shall be held at Geneva, Switzerland, to review the operation of the Convention, with a view to assuring that the purposes of the preamble and the provisions of the Convention, including the provisions concerning negotiations on chemical weapons, are being realized. Such review shall take into account any new scientific and technological developments relevant to the Convention''.

In fact, since 1980, the Review Conference has met almost every five years and has adopted several recommendations in order for the Convention to strengthen. To this purpose, the Meeting of Experts, and the Meeting of States Parties take place. The main task of these Conferences is to check whether the states obey the laws of the Convention about the prohibition of biological weapons (Goldblat, 1997).

11.2.13. Article XIII

(1) ''This Convention shall be unlimited duration

(2) Each State Party to this Convention shall in exercising its national sovereignty have the right to withdraw from the Convention if it decides that extraordinary events, related to the subject matter of the Convention, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other States Parties to the Convention and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests''.

So far no Member – State has exercised its right to withdraw from the Convention.

11.2.14. Article XIV

(1) ‘‘This Convention shall be open to all States for signature. Any State which does not sign the Convention before its entry into force in accordance with paragraph 3 of this Article may accede to it any time.

(2) This Convention shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the United Kingdom of Great Britain and Northern Ireland, the Union of Soviet Socialist Republics and the United States of America, which are hereby designated the Depositary Governments.

(3) This Convention shall enter into force after the deposit of instruments of ratification by twenty-two Governments, including the Governments designated as Depositaries of the Convention.

(4) For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

(5) The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession and the date of the entry into force of this Convention, and of the receipt of other notices

(6) This Convention shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations’’.

On January 7 – 16 November, 2016, the eighth Review Conference stated that the ratification of the Convention by the signatory States is crucial. Furthermore, the State – Parties should try to encourage and persuade non – signatory States to enter the treaty. In this way, the purpose of the Convention which is the prohibition of biological weapons will be fulfilled.

11.2.15. Article XV

‘‘This Convention, the English, Russian, French, Spanish and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of the Convention shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States’’.

According to the Eighth Review Conference of the State Parties to the BWC (2016) Arabic language was added to the official languages of the Convention.

12. Biotechnology

‘‘*Biotechnology as defined in the Convention on Biological Diversity is taken to mean ‘any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use’’*(Nixdorff, Schlling, & Hotz, 2004). The development of biotechnology is related with two important techniques which are being used for the medical science and the food security: the genetic engineering and the molecular biology. These two techniques have both positive and negative aspects. More specifically, these techniques can become a shield for a state and, therefore for citizens against any biological threat and they can be used for peace – protection purposes (Nixdorff, Schlling, & Hotz, 2004).

On the other hand, these methods could be very detrimental as they can offer to anyone who has offensive plans, new ways and new possibilities for better and more suitable weapons regarding the biological warfare. The absence of verification measures of the BTWC has given rise to a great deal of anxiety concerning the effectiveness of the Convention. Without any mechanism, responsible to check whether the States abided by the rules of the Convention or not able to impose sanctions, every State can do everything it wants. The establishment of a verification group is necessary as biotechnology is developed and new elements are coming into the surface, and they could be either effective for the civilian protection either destructive by provoking chaos and by influencing in a negative way the public health (Nixdorff, Schlling, & Hotz, 2004).

13. Development on the 21st century concerning the prohibition and safety from a biological attack

The BTWC, 1972, is the key – convention in which the states are prohibited from the use of biological weapons. From the end of 19th and on onset of 21st century, new perpetrators came

into the surface. The bioterrorists groups came into light. After the shocking incident in 9/11 in the USA, the bioterrorists sent anthrax spores via mail to several significant political and media persons with the result, many infections and 5 deaths. Furthermore, two times in 2013, ricin was sent to US President Barack Obama. The threat of the biological weapons still exists in the 21st century. The terrorists, because of the rapid development of technology and the fact that they can easily find the way of the development of these weapons, they can produce them and use them for their own purposes.

13.1. Bioterrorism

''Bioterrorism can be defined as the intentional release, or threatened release, of disease – producing living organisms or biologically active substances derived from living organisms, for the purpose of causing death, illness, incapacity, economic damage, or fear'' (Weinstein & Alibek, 2003). The bioterrorism is an appealing strategy not only for the states but also for individuals and for groups which want to spread the sense of fear and diseases (Wheelis & Sugishima, 2006). The acts of bioterrorism are characterized by four important elements: a) the use or the threat of use of biological agents and toxins b) the possible actors could be any individual or groups c) the targets are the civilians and agricultural species such as animals and plants (nonmilitary targets) d) the acts of the bioterrorist are based on political, ideological, and religious motives (Wheelis & Sugishima, 2006). If the bioterrorists act, in order to take revenge or to gain profit, then these acts are not considered as bioterrorists, but it is, in the field of biocriminality (Wheelis & Sugishima, 2006). After the BTWC Convention in 1972, it was believed that there were minimum chances for biological attacks and especially from a terrorist group. In reality, the events turned out differently.

Behind from a terrorist attack, they can be hidden political and ideological motives. It is not necessary for the terrorist to use only conventional weapons, but they can weaponized biological agents to accomplish their purposes (Elyasa, 2021). As it concerns the bioterrorism, there is the intentional use of biological weapons in order to prevail the panic and the chaos. There were some serious incidents which they proved that the biological terrorist threat is present, and it will be a significant obstacle for the supremacy of world peace.

Behind the bioterrorism attack in Oregon hamlet of The Dalles, there were political motives by a religious cult. Two days before the elections, the members of the cult wanted to influence the votes of the citizens by poisoning the domestic restaurant salad bars (751 dysentery cases), and they wanted to prove that the health system is inadequate to provide proper medicine care to the patients. After one year the leader of the cult, confessed that the attack was intentional for the elections and the police discovered the cult laboratory in which the member developed the biological agent *Salmonella typhimurium*.

After the worldwide shock of the incident on September 11 in 2001, the biological terrorism knocked again the door of USA. From 4 of October and for many months, the citizens of USA were anxious, stressed and they have the sense of fear. The biological agent of anthrax was spread via mail to several persons. This outbreak had twenty-two infected persons, eleven with cutaneous anthrax and eleven with inhalational anthrax and five citizens lost their lives.

The targets of these kind of attacks are not only humans but also animals and plants. Even though there are several conventions which prohibit the biological warfare, there are countries which are suspicious having or developing biological weapons such as USA, United Kingdom, Syria, Taiwan, Germany, India, Iran, Iraq, South Africa, Russia Pakistan, North Korea, Libya, Laos, China, Cuba, Argentina, Brazil, China, Canada (Elyasa, 2021).

To protect the global population and to secure the world peace, the UN Security Council, decided in 2004, to strengthen the measures against the biological weapons and adopted the Resolution 1540.

13.2. UN Security Council Resolution 1540

The great panic and the incalculable catastrophe caused by the events of 9/11 and other terrorists attacks, as well as the intention of terrorist organizations such as Al – Qaeda to acquire weapons of mass destruction were the main stimulus for the adoption of the Resolution 1540 by the UN Security Council (Crail, 2006). The Resolution 1540 was adopted in April 2004 with the aim of filling the gaps which were left by the previous treaties and creating new ways of tackling the WMD (Crail, 2006). The first and the crucial obligation of the states is to adapt their national legislation and implement the provisions on the prohibition of WMD and pay attention in order to prevent the delivery of hazardous materials as well as the means to non –

state actors (Crail, 2006). This Resolution is a global innovation. All previous treaties, such as the BTWC and Chemical Weapons Convention (CWC), have listed only states as potential perpetrators for the use of these kind of weapons. The Resolution is adapted to the circumstances, it recognizes criminal terrorist acts as acts that can cause great damage to people, animals and plants and terrorists as potential perpetrators and users of dangerous weapons (Crail, 2006). The intention of the Resolution 1540 is to strengthen states' commitment to the ban of the proliferation of weapons of mass destruction (Crail, 2006).

Among other things, the Resolution emphasizes that the proliferation of weapons of mass destruction poses a threat to the stability of the societies and to world peace and that states must abide by their commitments on the issue of arms control and the state disarmament from the three kinds of weapons (chemical, biological and nuclear). Furthermore, this Resolution encourages the states to participate in global multilateral treaties which aimed at eliminating the proliferation of nuclear, chemical, and biological weapons and to take appropriate measures to combat anyone who seeks to disrupt world peace using these weapons. In addition, the international communication and cooperation on national, subregional, regional, and international level, is promoted as the transfer of materials concerning the biological agents for peaceful purposes is accepted but the transfer must not be done as a cover for terrorist acts (UN Security Council Resolution 1540, 2004)

The most crucial and important part of this document is that all states must enforce their national legislation and adopt and implement effective measures in order to ''*prohibit any non – State actor to manufacture, acquire, possess, develop, transport, transfer or use nuclear chemical or biological weapons and their means of delivery, in particular for terrorist purposes, as well as attempts to engage in any of the foregoing activities, participate in them as an accomplice, assist or finance them''.* The effective measures could be border controls and appropriate regulations for national export and trans-shipment controls. Prohibiting the proliferation of chemical, nuclear, and biological weapons, should be a collective effort by all states in order to avoid any unpleasant and destructive large – scale situations with humans, animals and plants, as victims (UN Security Council Resolution 1540, 2004).

13.3. Organizations and programs against the proliferation of Weapons of Mass Destruction

One of the major efforts which happened the first years of 21st century, for the cause of non – proliferation of weapons of mass destruction is the Project Bioshield (Russell,2007). After the incident in 9/11 and the anthrax attacks, President George W. Bush make his proposal about the Project. The main purpose of the Project Bioshield is the development of protective measures against threats coming from chemical, biological, radiological, and nuclear weapons. The development of the medical countermeasures is connected with the advanced research and the clinical development (Russell,2007). The years of the implementation of the Project, significant progress has been made in order the protection of the civilians from the threat of biological agents such as anthrax, botulinum toxins and smallpox (Russell,2007). The funding of the Program from 2019 until 2029 will 7.1$ billion.

According to Richard Cupitt (2021), apart from the Resolution 1540 and the BTWC there are several organisms and conventions which their cause is the prohibition of WMD. Some of them are the Global Partnership Against the Spread of Materials of Mass Destruction, the Proliferation Security Initiative, the International Convention for the Suppression of Acts of Nuclear Terrorism, and the Global Initiative to Combat Nuclear Terrorism (Cupitt, 2021).

14. Greece's stance on the issue of no proliferation of weapons of mass destruction

As it is already mentioned, WMD (chemical, biological and nuclear), as well as the related evolution of technology pose a huge threat to world peace and security. The use of these weapons is contrary to the basic principles of humanitarian law as these weapons can not be controlled unlike conventional weapons, and after their use, no distinction can be made as to who the victim, will be unarmed population or militants, since these elements, for instance

biological agents, are transmitted mainly through the air. Greece recognizes the enormous dimensions of the issue of WMD, and it is an ardent supporter of nuclear free zones in geographical areas with intense war conditions, such as the Middle East (Hellenic Republic Ministry of Foreign Affairs, 2019)

Greece is a party to many conventions concerning the weapons of mass destruction: Non-Proliferation Treaty, Comprehensive Test Ban Treaty, Chemicals Weapons Convention, BTWC. Furthermore, Greece is member to several groups: the Nuclear Suppliers Group which contribute to the non-proliferation of nuclear weapons, the Missile Technology Control Regime which limits the proliferation of missiles by export control. Moreover, Greece is part of the Australian Group for chemicals and biological weapons, the Wassenaar Arrangement for the control of national export concerning the conventional weapons and dual use goods and last but not least, the Zangger Committee which is responsible for the handling of certain types of nuclear fuel. The signature of Greece was on October 4, 1972, and ratified it on October 12, 1975 (Hellenic Republic Ministry of Foreign Affairs, 2019).

Conclusion

The biological warfare strategies have shown their dynamics from the ancient times until now. The biological agents were developed over the centuries, from the use of infected arrows and the contamination of the wells by the animal cadavers to mailing a letter full of anthrax spores. Biological weapons along with the chemicals and nuclear ones, are the most dangerous weapons which can provoke mass destruction not only to a great number of the world population but also, to environment and animals. The unpredictable character of the biological agents, as after their release, there is no distinction between unarmed population and militants, the transmission can occur only by breathing, the rapid development of the technology and the fact that everyone, easily, can find information on Internet and develop an agent without scientific experience, all of these make biological agents hazardous materials which can cause panic and chaos.

The effort of the prohibition of these weapons and more specifically, the poisonous gases, started in the end of 19th century. In recent times, states and international organizations are trying to eliminate the biological weapons and to prohibit the proliferation of WMD. The most crucial convention regarding the prohibition of biological weapons is the BTWC, 1972 which

it was based on the Geneva Protocol,1925. However, even today, there are threats which still exist. Bioterrorism is an issue that rises great concern for world peace and security. Despite of the difficulties regarding the prediction of a biological terrorist attack or a biological attack from a country, states and international organizations have adopted and implement several Conventions and mechanisms in order to eliminate the WMD and efforts are made for medical countermeasures in the case of biological, nuclear and chemical attack.

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