

Consequences of biological warfare on ecosystems

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Algeria.**Sarah.maane1993@gmail.com**Accepted 18/02./2025 Received 04/02/2025***• Abstract:**

This research aims to investigate the various effects of weapons of mass destruction of all kinds (biological, chemical, and nuclear) on the environment. Biological weapons are considered as one of the most lethal and destructive weapons known, as they are used to deliberately cause epidemics among humans and to destroy the environment in terms of water, air, and soil. They are also used against crops and livestock, which are the core of the economy of some countries. The use of all kinds weapons of mass destruction constitutes one of the greatest concerns and challenges to global security and peace whenever international wars and conflicts are raised; this is owing to the magnitude of the damage and risks resulting from their use in the First and Second World Wars, as well as the tremendous development in the materials used in these weapons with the ease and possibility of transporting them anywhere in the world at present.

Keywords:

Weapons of Mass Destruction, Epidemics, Biological Warfare, Environment.

• Introduction

This last century has witnessed a rapid development in the type of weapons used in wars and in the efficacy and destructive ability of these weapons. The war industry in this era has led to the invention of means of annihilation that have a great impact on the destruction of humankind and nature together by using chemicals. Based on the use of these materials, this type of warfare has been called chemical warfare. However, it is not only gases and chemical compounds that receive care and attention, but leaking fevers, germs, and viruses constitute another terrible weapon of war that may outweigh its impact, harm and spread of all other weapons and is the most man of

war seeking to destroy humanity. Russian Marshal Zhukov said: "The next war will not win with nuclear weapons and air power alone, but will use biological and chemical weapons to support conventional and nuclear weapons."

In order to address the risks and damage resulting from the use of biological and chemical¹ weapons on human security, the international community has rushed in the past decades to sign many agreements trying to prohibit the use of these types of weapons due to the damage they cause to humans and their surrounding environment including its various components. This study examines the effects of biological and chemical weapons on the environment, as well as efforts to limit the global spread of these types of weapons.

- **Research problem**

This research addresses the following problem: What are the effects of using biological weapons on the environment and biodiversity? What role has the international community played in controlling these weapons, and what measures has it taken to protect its environment in light of these developments?

- **Purpose of the study**

The repercussions of the war extend to various sectors in conflict areas, and its economic and political effects are everyone's concern and top local and international governments' agendas. However, despite its seriousness and the severity of its damage, the impact of the war on the environment remains overlooked.

The environment has a specific capacity to absorb the changes that occur due to human activity. If it exceeds its capacity, this leads to an imbalance that is difficult to treat or compensate for its losses. It should be noted that wars affect all environmental elements, including water, air, soil and food in various local and regional places. Therefore, this study aims to search for new mechanisms to protect the environment from these deadly weapons. Development should also be for the environment, and this requires reconciliation between the environment and man rather than conflict between them, which is done by limiting deliberate and undeliberate acts of aggression against the environment and its various elements and the negative impact of biotechnological progress on the environment

1. Definition of terms

1.1 Concept of ecology

The linguistic definition comes from The Latin word, ecology, is of Greek origin derived from OIKOS, which means dwelling. Its English drawing in the Oxford Dictionary was initially

¹ Murad Wahba, *The Philosophical Lexicon*, (Cairo, Dar Quba Al-Haditha for Printing, Publishing and Distribution, 2007)

OECOLOGY and was used by Ernst Haeckel in 1866. Its drawing in the aforementioned lexicon appendix was changed to ecology in 1891.¹

The terminological definition of ecology refers to all the things and phenomena surrounding and affecting the individual, including the natural or external environment, the organic or internal environment, the social environment, and the intellectual environment. This word refers to all things or factors that are visible and invisible that surround living organisms in this world.² Besides, Ernst Heikal defined it as the science of investigating all the relationships between organisms and the organic and inorganic environment, including the relationships of friendship and enmity when animals come into direct and indirect contact.³

1.2 Concept of biological warfare

Biological warfare is defined according to the military concept contained in the Military Encyclopedia as (the approved military use of living organisms and their poisons to kill or cause damages to man or her or his property of animal or agricultural wealth to weaken her or his ability to wage war). This type of warfare is called bacterial warfare, or bacterial warfare, but the word (biological) is preferred because of its inclusion of bacteria and other types of microorganisms.

Biological warfare is a type of warfare that nature has waged against man since ancient times, often resolving an epidemic or disease due to many wars and conflicts. The strains, whether bacteria, microbes, viruses or germs, pose an imminent danger to humans as they threaten human lives and food sources. However, their greatest danger lies in their ability to spread infectious diseases rapidly. They have a high ability to move from one person to another invisibly and quickly, exacerbating the infections according to an escalating number sequence that does not stop at a certain point; this often leads to death or injury to millions, accompanied by an almost complete underground of economic life.⁴

1.3 Brief history of biological warfare

Human conflict is as old as life itself, and people struggle with each other for survival, money, power, resources, or some other reason. As a matter of fact, humans used many methods in wars, some of which were based on muscular strength, and then he used auxiliary tools such as stones, wood, iron, fire and water. He took help from animals, birds, reptiles and insects, then developed the use of transportation of all kinds to support warfare; in modern times, he resorted to corn and bombs resulting from their explosion and corn nuclei and bombs resulting from their fission. He also resorted to various incendiary, toxic, tearful gases that affect nerves.

² Asmaa Ibrahim Hussein Shankar, *Ecological Exhaustion and its Manifestations in My Novel (The Second War of the Dog)* by Ibrahim Nasrallah Zou(Alexandria 2050) by Sobhi Al-Fahmawi, (*Journal of the College of Islamic and Arab Studies for Girls in Damankhour*, Issue 5, Part 4, 2020) p.: 983.

³ Murad Wahba, *Philosophical Dictionary*, op. Cit., P. 124.

⁴ Hassan Salman Khalifa Al-Baydani, *Corona (Covid 19) between biological wars and economic wars*, (Iraq, Harab Center for Research and Studies, No. 33-34, eighth year - winter - spring 2020)

Besides, humans did not hesitate to use different microbes causing horrific poisoning or those resulting in death, and this fall under the term of biological weapons or bioterrorism. Man's attempts to deploy biological weapons began in 148 BC when Hannibal ordered his soldiers to bring pottery vessels filled with snakes and throw them on the enemy ships.⁵ It was also reported in ancient civilizations such as the Greeks and Romans were poisoning rivers and water wells in their wars and using Tartar's slingshots to throw plague-infected bodies into the town of Kava, which they were besieging and refused to surrender. Historians confirmed the spread of plague as a result of that incident.

Biological weapons were used in the modern era in the days of the First World War. They consist of toxic bacterial components that are dangerous in their spread and work to burn man and mutilate his body, which is one of the most dangerous weapons on the surface of the Earth so far, as nuclear weapons are superior in wars in terms of destructive power and their effects in human and material terms.⁶ The German army used a group of pathogenic microbes that affected humans and animals in the European countries that occupied them. In the Second World War, the Japanese used microbial weapons against the Chinese and the Soviets, and their effects lasted for a long time.

After World War II, many countries adopted microbial weapons programs. The United States of America, the Soviet Union, Canada, and England were among the first to do so. Seventeen countries were found to have developed the use of microbes as biological weapons within their weapons systems. In the early 1970s, most countries announced that they had ended these programs. In 1972, more than 140 countries signed a treaty to end the use of biological weapons and toxins. The treaty stipulated the destruction of all strategic stockpiles of these weapons.

However, it was later found that the Soviet Union had developed its biological weapons in the 1980s and early 1990s, and the United States was not far from developing its own.⁷ It was found that the basis of the program is the production of a large amount of smallpox viruses and the discontinuation of routine vaccines used against it. In 1980, the Soviet Union continued to use this biological weapon against humans. The Russians examined the inhaled anthrax microbe; congruently, a leak occurred in a Russian province called Sverdlovsk in 1979, resulted in 77 cases, including 66 deaths.⁸

In terms of effect, efficacy and performance, Chemical and biological weapons are known to be similar in their final effect but fundamentally different in performance and classification. While chemical weapons are transferred through their toxic and direct impact on the human body and its various vital systems, they remain in places of use for hours or weeks. Then, their effect is reduced until they become ineffective. Biological weapons are types of bacteria or viruses designed to kill humans, animals, or plants and reach humans through air, food, water, or injection.⁹ After exposure, there is an incubation period during which they multiply, and then the infection can spread.

⁵ Mustafa Ashour, *Microbes and Biological Warfare*, (Alexandria, Al-Maaref Establishment, Jalal Hezi and Partners, 2005)

⁶ Hadiya Ahmed Mohammed Zaatat, *International Responsibility and Biological Weapons (Corona Virus – a Global Case)*, (Saudi Arabia, University of Majmaah, 1442AH-2020AD)

⁷ Mustafa Ashour, *Microbes and Biological Warfare*, op. Cit., P. 7.

⁸ Ibid., p. 8.

⁹ Hadiya Ahmed Mohamed Zaatat, *International Responsibility and Biological Weapons (Corona Virus – a Global Case)*, op. Cit., P. 11.

Furthermore, military armies prefer the use of chemical military weapons in wars because their effect is faster than that of bacteriological weapons. However, in the event of the inability to use chemical weapons, they resort to biological weapons that usually leave the mark of use. They do not need a military battle to use them, as they are spread through infection, especially as they may get out of control.¹⁰

1.4 Types of chemical and biological weapons and the most dangerous ones

Biological weapons revolve around mass destruction and the use of viruses, fungi, bacteria, or toxins resulting from these organisms. The danger of these biological crimes comes from several countries. The simple method of these weapons depends on spraying on a commercial scale in agriculture by small aircraft or by agricultural spray to create a dispersed linear source at the centre of large human populations.

- Anthrax is a powerful biological weapon, so releasing the Anthrax strain 100 km antennae would cause hundreds of disasters. the use of Anthrax causes the highest death rate and the highest incidence of disability.
- Sarin gas attacks the nervous system enters the body through the respiratory system or at high temperatures through the skin and is killed within minutes or hours.
- Mustard gas attacks the skin, respiratory system, and mucous membranes and causes burns, ulcers, and blindness. It begins to kill about twenty-four hours after exposure to it, and many other such weapons.
- Anthrax is one of the most dangerous chemical and bacteriological weapons in existence that has been used, and its incubation period ranges between two days and two weeks, and it kills eighty percent of its victims whose bodies enter through the mouth or the respiratory tract.
- The plague (flag) is a laboratory-produced widespread disease that kills ten percent of those infected.
- Fira (Butch linoletoxin), the deadly crimes found in poisoned food, enters the production of this toxin in a laboratory, enters the body through the eye, lungs or intestinal tract, and is killed after a period of three or eight days.
- Many viruses are used and spread for the sake of wars; Crostrin porphyrin, a bacterium poisons food, produces seeds that live in the soil and produces gangrene gas seeping into open wounds and develops tumours, physical trauma, jaundice to death. In addition, Sacchylocaine enterotoxin G, is caused by orange staph bacteria. Its symptoms are similar to food poisoning, fatal if combined with dryness of the body, and others...et cetera.¹¹

The militants determine all the required qualities to be available in a germ, and the specialized scientists prepare the required germ and the anti-vaccine for fear that it will return to their soldiers.

It is also necessary to take another precaution, which is not to transfer the used germ from man to man if what the strength of the germ will be after its proliferation in nature, and what is the

¹⁰ Hadiya Ahmed Mohamed Zaatar, *International Responsibility and Biological Weapons (Corona Virus – a Global Case)*, op. Cit., P. 11.

¹¹ Hadiya Ahmed Mohamed Zaatar, *International Responsibility and Biological Weapons (Corona Virus – a Global Case)*, op. Cit., P. 13.

value of the vaccine that protects it scientifically. If this condition is met, the manufacturing power can enter the infected places by taking a few precautions.¹² For military needs, the bacterial action has to be characterized as follows

- It can spread epidemic diseases among many individuals and animals in different ways and with small quantities of microbes or toxins.
- There is a short incubation period, ranging from a few hours in the case of toxicosis to a few days or weeks in the case of microbes, during which the individual does not feel sick. The duration depends on the number of microbes and the degree of immunity of the individual to the disease.
- Some infectious diseases are directly transmitted through contact, and individuals infected with these diseases are considered as a source of infection (plague, cholera, smallpox). Infection occurs when using objects contaminated with microbes, such as tularemia and brucellosis, called potholes.
- The strength of the spread of biological materials in a cloud shape resembles the cloud of chemicals. They can infiltrate buildings and facilities without a tight tube. When they fall in the form of droplets, they contaminate the inner walls and other objects and, thus, help these things transmit and spread infection.
- Detecting the presence of microbes and their toxins requires a long time and special equipments although the use of biological materials can be suspected by phenomena or signs such as the sound of the explosion, bombs with a muffled sound, or the presence of liquids or powder at the explosion scene. Indeed, identifying the type of microbes used promptly are crucial for the possibility of control and treatment.¹³
- There is a diagnosis of the resulting symptoms for a longer period since the clinical picture differs from the normal conditions of the biological combination containing different types of microbes and toxins. Also, the quantities used and affected may be larger or occur unusually.
- If the enemy uses radioactive and chemical materials, the danger becomes much more than biological weapons alone and the death rate increases.
- It is easy to prepare and resistant to natural heat, weather factors, and common medications.¹⁴

2. Risks of biological and chemical warfare and its impact on humans and the environment

Wars lead to rapid environmental degradation as people struggle to survive, and environmental management systems disintegrate, resulting in damage and danger to vital

¹² Munib Al-Saket, Ghaleb Sabarini, Madi Tawfiq Al-Jaghbir., *Chemical, Biological, Nuclear Weapons of Mass Destruction*, (Amman, Dar Zahran Publishing and Distribution, 2009)

¹³ Munib Al-Saket, Ghaleb Sabarini, Madi Tawfiq Al-Jaghbir., *Chemical, Biological, Nuclear Weapons of Mass Destruction*, (Amman, Dar Zahran Publishing and Distribution, 2009)

¹⁴ *Ibid.*, p. 82.

ecosystems. Armed conflicts have occurred in more than two-thirds of the world's biodiversity regions for more than six decades, posing serious threats to preservation efforts. Wars have a significant impact on biodiversity, which constitutes a tragedy that does not end with the end of the war and its decline.¹⁵ Moreover, an attack on the environment damages ecosystems and natural resources for a long period after conflict and even during conflicts and military wars, which often extend beyond the borders of international territories to the borders of another state.¹⁶

2.1 Human impact

The impact of the factors on humans ranges from inconvenience to disease and then death, depending on the dose and immunity of the person and preventive measures. Although the time to reach the level of infection takes several days, the duration of the disease remains for months, and the symptoms are according to the agent. The following are the factors that help spread the epidemic:

- The first is the high number of *unvaccinated people* against the disease and the low number of immunized people, whether with a previous disease or with the vaccine.
- *Social conditions*: such as crowding: In cities, schools, and gatherings as in armies, places of worship, and war zones, it is easy for spreading infections, especially those that spread through the air, mouth, and airways.
- *Means of transmission*: The epidemic in the city in succession facilitates its spread from the patient to the healthy.
- *Environmental conditions*: For example, influenza in winter and diarrhoea in summer, and the environmental effects on the spread of diseases can be summarized as follows:
 - The effect of the atmosphere on the virus is the weakest possibility because the virus is protected inside the patient from air temperature fluctuations, whether hot or cold.
 - The impact of the atmosphere on humans is affected in multiple ways in different seasons. In the cold winter, mucus secretion in the airways is frequent. Body temperature is less than normal and unregulated, and people gather inside closed places, especially children. This facilitates the transmission of infection of the airways.
 - *In summer*, hot weather encourages the multiplication of microbes in food, which is why intestinal diseases abound. The most influential diseases in the seasons are those transmitted by insects, and the life phase of these insects determines the seasons of the epidemic.
 - *In cold areas*, most insects are full-grown only in summer, so the diseases that transmit them disappear in the winter.
 - *In hot areas*, insect-borne diseases, such as mosquitoes, are common, and water larvae are important in their lives.

¹⁵ Abdelkader Mohammed Al-Kharraz, *The Impact of Conflicts on the Environment and Ways to Reduce Negative Impacts, "The Case of Yemen"*, (Cairo, Presentation to the Regional Consultation Meeting on Environment and Natural Resources of the Arab Forum for Sustainable Development and the High-level Political Forum, 2019)

¹⁶ Mehdi Qattoush, *War and its Impact on the Environment (Some Arab Countries as a Model)*, (Journal of Legal and Political Thought, Volume 3, Issue 2, 2019)

- For age, children are most susceptible to infection in endemic epidemiological activity.
- Diseases spread from pets in abundant numbers.
- Effects are prevalent owing to weak means of control.¹⁷

2.2 Impact on the environment

For fauna and flora, Biological and chemical warfare factors affect plants and agricultural crops, affecting the economic situation. For example, they can eliminate the crops on which the country depends, such as rice, citrus fruits, cotton, etc. These factors impact plants through contact with them or through growth near them.¹⁸

War destroys biodiversity, increases pollution and significantly contributes to environmental degradation. In the case of Ukraine, journalists and activists have documented hundreds of crimes, ecocide, and serious damage to nature in the country, from attacks on industrial facilities polluting groundwater supplies to the deliberate bombing of wildlife refuges and other important ecosystems.

Biological and chemical agents affect various animals to prevent meat and dairy products needed by both parties and prevent their use as transporting agents.¹⁹

Collateral damage from the conflict could also kill up to 90 percent of large animals in the war zone. For instance, Mozambique's Gorongosa National Park lost 95 percent of its biodiversity after a long civil war.

According to CEOBS, all tanks and heavy vehicles that roam in conflicts request the release of abrasive particles, while neglected munitions cause uranium to leak into water systems in addition to this the approved destruction of ecosystems, forests and species.

Pollution resulting from wars contaminates water bodies, soil, and air, making areas unsafe. Impacting marine ecosystems, warships release vast amounts of waste into water bodies, degrading marine habitats and coastlines.

The use of internationally banned chemical weapons and impacts the environment. "In the case of Gaza, Israel uses white phosphorus, which is internationally banned, according to Human Rights Watch, and which is carried by the wind to seep into the soil or deep into rivers and seas and into marine organisms such as fish, threatening the safety of the environment. Chemicals leak into soil and groundwater in mine and explosive planting areas."²⁰

2.3 Impact on climate

¹⁷ Munib Al-Saket, Ghaleb Sabarini, Madi Tawfiq Al-Jaghibir. *Chemical, Biological, Nuclear Weapons of Mass Destruction*, op. Cit., P. 81.

¹⁸ Munib Al-Saket, Ghaleb Sabarini, Madi Tawfiq Al-Jaghibir. *Chemical, Biological, Nuclear Weapons of Mass Destruction*, op. Cit., P. 81.

¹⁹ Munib Al-Saket, Ghaleb Sabarini, Madi Tawfiq Al-Jaghibir. *Chemical, Biological, Nuclear Weapons of Mass Destruction*, op. Cit., P. 81.

²⁰ Ahmed Shawky Al-Attar, *A Comprehensive Guide to Writing about the Impact of Wars on Climate Change and the Environment*, (6/11/2023) , <https://www.icfi.org/>

Wars and conflicts disrupt climate action and exacerbate resource shortages associated with addressing climate change. They also impair the ability to develop strategic projects aimed at preserving the environment and meeting the diverse needs of populations at a time when the consequences of climate change are severe.

The impact of war on the climate and environment has many negative effects on the mental, physical and psychological health of populations within conflict zones.

The ICRC also acknowledges that climate change has devastating consequences for people living in conflict and those without access to basic health care.

The war also leads to more toxic dust and chemical residues that pollute the environment, water sources and food and cause cancer, fatal infections and congenital disabilities.

On the other hand, climate change causes droughts, floods and epidemics. Climate change causes droughts, floods, insect epidemics, and changes in rainfall patterns; these can endanger food production and people's survival and spread deadly diseases such as malaria, dengue fever, and cholera. Conflicts and wars exacerbate these health risks because they limit the capacity of health facilities. In Gaza, hospitals were mainly targeted, and the rest of them were preoccupied with the increasing demand for emergency health assistance due to the war at the expense of other cases. Also, in Gaza, contamination from the blockade and war caused the spread of deadly pneumococcal infections and was gradually exacerbated by the lack of adequate health care.

While worsening climate change increases the future risks of violent armed conflict and wars and conflicts within countries, according to a Stanford University study, war and its negative impact on the environment and climate may also lead to increased waves of migration and displacement. For example, the ongoing war and conflicts in Libya have deteriorated the infrastructure in Derna and disrupted the city's climate control projects, causing it to collapse when faced with catastrophic floods. The result has been the displacement of more than 43,000 people. This story from BNN Bloomberg reveals the role of war and ancient dams in leaving Libya vulnerable to storms and floods, eventually leading to population displacement.²¹

3. Prohibition of the use of weapons harmful to humans and the environment

International environmental crimes are multiplying at an astonishing speed, which made the international community rush to sign several international conventions. Perhaps the four Geneva Conventions of 1949 are one of the most important, given the negative consequences of wars on the environment; Consequently, the global legal systems began to prioritize environmental issues and protection under the international law.

The United States has approved the declaration prohibiting the use of weapons of all kinds, given that this is contrary to the spirit and letter of the Charter and the rules of justice and fairness in the world. Some wars in the world were contrary to the rules of international humanitarian law, which caused widespread damage to the environment, as the use of weapons polluted waterways and poisoned groundwater.²²

²¹ Ahmed Shawqi Al-Attar, *A Comprehensive Guide to Writing About the Impact of Wars on Climate Change and the Environment*, (November 6, 2023). • <https://www.icfj.org/>

²² Mehdi Qattoush, *War and its impact on the environment (some Arab countries as a model)*, op. Cit., P. 179.

3.1 Prohibition of biological and chemical weapons

Global efforts to restrict biological weapons began after World War I, and the Protocol banning the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare of 1925 prohibited the use of chemical weapons as well as biological weapons. In the 1930s, attempts were made to prohibit the production and stockpiling of biological weapons at the World Congress on Disarmament, but this did not result in anything because of the collapse of the congress in 1937.

After World War II, efforts to monitor biological and chemical weapons remained interlinked. In 1962, the elimination of chemical and biological weapons was placed on the agenda of the then newly established Eighteen Commissions of Disarmament.

The stalemate in the modern Eighteen Committee of Disarmament 1968 led to Britain's proposal to separate discussions on the two issues. In 1969, Britain submitted a blueprint convention on the production, possession, transfer and use of biological weapons as well as research into biological weapons and their delivery systems. The Soviet Union, however, rejected this project, opposing the separation of talks from both biological and chemical weapons.

Thereafter, discussions remained deadlocked until the spring of 1971, when the Soviets abruptly changed their position and accepted the separation of negotiations. As a result, in August 1971, the Soviet Union and the United States drew up a similar draft on Biological Weapons Convention. On 10 April 1972, the convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and Their Destruction was signed, preventing the development, production, stockpiling or acquisition of biological agents and toxins for non-peaceful purposes and the related means of delivery.²³

In addition to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Bacteriological) and Toxin Weapons and Their Destruction, some states have attempted to curb the risk of proliferation of biological weapons for export control on the diversion of potential biological agents and their delivery systems. Established in 1985, the Australia Group is an informal group of States that aims to coordinate the export and national control of materials that can be used to manufacture biological and chemical weapons. The Group maintains detailed control lists of materials and equipment, including 93 pathogens and toxins affecting humans, animals or plants, and a small set of production equipment. Group countries review the export of such items to ensure that they will not be used in a biological weapons program.²⁴

3.2 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD)

²³ Steve Tullio, Thomas Schmalberger, *Towards Agreement on Security Concepts: A Dictionary of Arms Control, Disarmament and Confidence-Building Terminology*, (Switzerland, UN Publications, 2003), p. 46

²⁴ Steve Tullio, Thomas Schmalberger, *Towards Agreement on Security Concepts: A Dictionary of Arms Control, Disarmament and Confidence-Building Terminology*, op. Cit., P. 47

A multilateral agreement was opened for signature on May 18, 1977, and entered into force in October 1978. The agreement is deposited with the Secretary-General of the United Nations and remains in effect indefinitely.

This Convention restricts changes on the environment leading to widespread, long-term or severe effects caused by intentional human control of natural processes, and it prevents any changes in the dynamics, composition or structure of the earth, including its atmosphere and outer space as means of causing destruction, injury or damage to a State Party. The term "widespread" includes an area covering several hundred square kilometres. "long-term" is defined as a period of months or one quarter, and "severe" is defined as involving serious or significant disruption or damage to human life, nature and economic resources. This includes intentionally causing phenomena such as earthquakes, marine seismic waves, disturbance of the ecological balance of an area, changes in climate patterns, and changes in ocean currents and allows the exclusion of changes below the threshold established by the agreement or made for non-hostile purposes.

The Convention does not contain any specific provisions on verification, although the Advisory Committee of Experts may undertake fact-finding missions at the request of a State Party.²⁵

3.3 Environment across parenting and ethical commitment

The environment has formed and is still for man that vital area in which he lives, which allows him to settle, because of its buried treasures and various natural resources, enabling to develop ways of adapting to them and brought him to a high degree of well-being, but humans' whim for violence, control and ownership made him ignore all the dangers resulting from his irrational and excessive exploitation of the wealth of the environment

Given that deteriorating environmental conditions and the exacerbation of problems are caused by human ambition and greed, this forced the world to rush to find peaceful solutions to address human errors and repeated violations; among the solutions stressed by the international community environmental education and media is to transfer knowledge, values, behaviors and skills capable of enabling individuals to identify environmental problems, as well as find appropriate solutions to them. Indeed, they are mainly aimed at creating the environmental conscience that controls environmental decisions to find a way to peaceful coexistence and calling for the need for concerted and integrated efforts between the states and for signing conventions and treaties hoping to terminate the practices disrupting the environment.

In addition, there is a range of methods that man can use in order to achieve his goals in the field of environmental education, such as conducting specialized lectures, seminars, seminars, conferences and workshops to raise awareness and increase education on various environmental issues such as birth control or pollution control, and implementing radio and television programs that reveal the environmental facts of the citizen. It sees its role and responsibilities towards the problems of the environment and then uses the press to spread environmental awareness through its articles, cartoons and other reporting methods, that is, encouraging individuals to visit museums, exhibitions, zoos and nature reserves, which are important sources of environmental information

²⁵ Steve Tullio, Thomas Schmalberger, *Towards Agreement on Security Concepts: A Dictionary of Arms Control, Disarmament and Confidence-Building Terminology*, op. Cit., P. 50

for people of all categories, provided that these visits develop positive attitudes towards the environment.²⁶

- **Conclusion**

Biological warfare in its various forms remains challenging for international peace and security, with its effects on the environment and the uncontrolled dangers it poses. It is difficult to neutralize even for those who launch this sort of wars. Aware of these dangers and effects, the world is trying to limit the spread of these weapons and their presence at the international level through the signing of many international agreements that still do not receive international consensus to join them and respect their provisions, which makes the global environment always safe from the use of these weapons in war and international conflict in the future; this is what the countries of the world are afraid of, during any tensions in international relations, especially between countries with nuclear capabilities.

In the end, the world urgently needs some kind of international consensus and commitment on the international ban of these weapons, given that their uses may harm the planet as a whole.

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