

## Unveiling the Silent Threat: Bioterrorism as a Genuine Global Biosecurity Threat



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### Abstract:

*The study of the complex and interconnected relationship between biosecurity and bioterrorism aims in several ways to raise awareness of the silent threat of bioterrorism, as a genuine biosecurity threat and advocates the necessity of understanding the intersection between biosecurity and bioterrorism, within the framework of global security policies. By recognizing its secretive nature and the potential for devastating consequences, this study debates the challenges associated with detecting and preventing bioterrorist attacks, as well as the Risks for governments and international organizations in effectively combating bioterrorism. Furthermore, it explores the implications of bioterrorist attacks, including the potential for widespread panic, economic disruptions, and strain on healthcare systems. As well as, Bioweaponization poses a profound and multifaceted threat to both international security and public health. The repercussions of such activities can result in a health crisis, substantial human casualties, and severe economic and security ramifications in global biosecurity.*

**Keywords:** Bioterrorism; Biosecurity; threat; Biothreats; Bioweaponization.

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## Introduction:

Recently, the world is facing to several threats such as epidemics, and bioterrorist attacks. These biothreats become a new challenge to biosecurity policies, and the most discussed topics at the international relation level, and contemporary security studies. Then to confront this challenge, it requires the adaptation of strategies that allow ensuring the biosecurity of communities.

Additionally, one of the most challenges is maintaining the balance between free trade, and public health protection, in aims to confront these new biothreats, and determine the border of the relationship between biosecurity, and bioterrorism.

For another hand, the requirement of understanding the specific nature of the relationship between biosecurity and bioterrorist attacks, bases for determine the extent of their interference. In addition, countries must improve international cooperation in biosecurity and strengthening national capacities to confront bioterrorism threats, therefore, current biosecurity must be analyzing their efficiency in her dealing with the bioterrorism threats.

Father than, it is necessary to identify the essence of the relationship between biosecurity, and bioterrorism. As a result, it requires developing both research and biological testing methods, and vaccines. With the need to strengthening health capacities in affected countries. Moreover, it recommended strengthening transparency and international cooperation to share information and facility access to biometric data, which is essential to obtain biosecurity.

## Principal study problematic

Generally, the international community confronts the challenges of bioterrorism as a threat to biosecurity. There requires effective cooperation and coordination to defend against them from countries and international organizations. In addition, it requires researching and analyzing current policies and strengthening international cooperation and coordination to protect public health and international security. Therefore, this paper leads us to ask about **"determining the contribution of biosecurity policies to confronting bioterrorism as a challenge to international relations by analyzing the nature of the interactive relationship between them."**

This problematic leads us to pose the subsidiary asks:

1. Researching the systemic foundations for understanding and defining the biosecurity and bioterrorism concepts.
2. Determining the nature of the relationship between biosecurity and bioterrorism, and in a supplementary way the interaction occurring between them.

3. Understanding the intersection areas between biosecurity and bioterrorism within global security policies.

To answer for this principal problematic, it is important to addressing the two hypotheses as follows:

**First Hypothesis:** it is necessary to talk about the inability of many countries to effectively monitor and control potential sources of bioterrorism as an important factor, that become a real bio-threat in the global security landscape.

**Second Hypothesis:** The transformation of biological resources and components into a potential source of threat to biosecurity necessitates a reevaluation of international and global security policies.

To answer the problematic of this paper, It recommends analyzing the relationship between bioterrorism and biosecurity for the answer to the study problematic, also it is necessary to determine an essential epistemological approach for differentiating between the related concepts of this paper.

As a result, this study employs a **biopolitical analysis approach** to understand global biosecurity policies that can provide valuable insights into global biological security policies. Farther then, this paper relies on **contemporary history narrative** to determine the chronological development of the relationship between the two concepts of study and their practical application at every stage of this research.

Therefore, to study the nature of the relationship between bioterrorism and biosecurity policies, this paper is divided into two principal axes as follows:

**1. Primarily: Toward regulating the concepts of biosecurity and bioterrorism.**

- 1-1. The problematic of defining bio-security and bio-terrorism terms.
- 1-2. The chronological context of "biosecurity" and "bioterrorism"
- 1-3. Conceptual definition and terminological perception of Biosecurity and Bioterrorism

**2. Secondly: The complex relationship between biosecurity and bioterrorism and the nature of their overlap.**

- 2-1. The academic debates regarding the intricate relationship between biosecurity and bioterrorism
- 2-2. Perspectives of IR theories for understanding the relationship between "biothreat environment" and the production of "biological threat"
- 2-3. Exploring "Bioweapons" and "Bioweaponization" concerns as interpretative models

**Conclusion**

### 1. Primarily: Toward regulating the concepts of biosecurity and bioterrorism.

To determine the concepts of the study, both the terms biosecurity and bioterrorism must be defined. This requires a fundamental study of the two terms in the first point and then presenting models of emerging bio-threats in the second point as follows:

#### 1-1-The problematic of defining bio-security and bio-terrorism terms.

In the 21<sup>st</sup> century, terrorist attacks have increased taking several forms, including biothreats, which require to define of the two concepts terms.

The concepts of biosecurity and bioterrorism intersect in the prefix "**Bio**". This term has an interesting connotation and requires further explanation and understanding before discussing the notion of bio-security and bio-terrorism<sup>i</sup>.

The term "**bio**" is used in reality due to its connection with biology - the life sciences - and its various scientific branches, such as **biotechnology**, **biochemistry**, or **biophysics**. (Lafon, 2006;p:3).

More than that, the association between the two terms extends to the social sciences, such as **bio-politics**, **bio-power**, and bio-ethics. Recently, the word "**Bio**" become one of the most used terms in developed countries. (Jadidi, 2016 ;pp:3-4)

Additionally, the two terms "**Bio**" and "**Biological**" have the same meaning of "**Vital**" or "**Organisms**", but in reality, there is little difference between them. Usually, the term "**Bio**" is used in scientific and technical contexts, while the term "**Biological**" commonly used in general language, and medical sciences (Reece, 2016,p:6). Thus, "Bio" can also be considered an abbreviation of "biological".

In practice, there is a difference between using the term "biological" and "**biotic**". The term "**biological**" refers to everything that is related to biology, and vital organisms, and it includes biological sciences, and bioresearch such as genetics, anatomy, fauna classification, energy, evolution theories, cells, etc. (Reece, 2016,p:7)

On the other hand, the term "**biotic**" refers to everything related to vital organisms and their environmental impact on societies, such as food supply, competition, cooperation, environmental impact on the marine, terrestrial, and aerial environments, as well as astronomical biology, biological resources, biodiversity, and many other topics related to life. It also encompasses their influence on the natural and human environment. (Reece, 2016, Ibid).

#### 1-2-The chronological context of "biosecurity" and "bioterrorism"

The chronology of the emergence of biosecurity and bioterrorism can be determined by significant historical events and developments as follows:

### A. The emergence of the terms "Biosecurity" and "Bioterrorism"

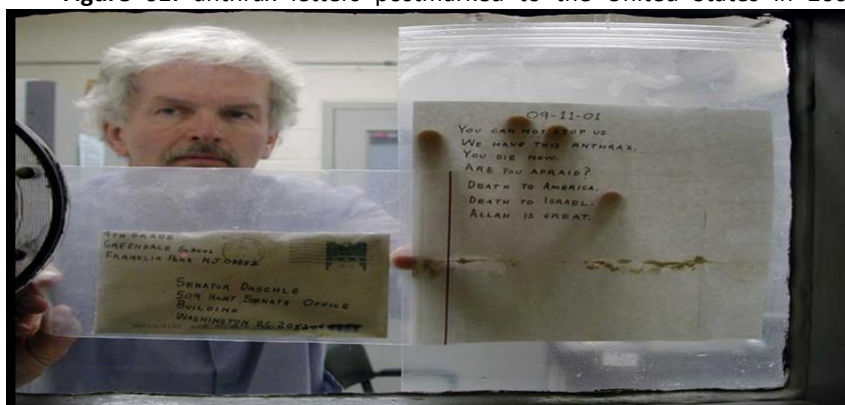
Recently, the emergence of biosecurity and bioterrorism is a result of using the bioweapons in conflicts and wars, by several countries. Especially with the increase of biothreats and terrorist attacks using the dangerous Bio-components. This led to the increase in global interest of biosecurity and bioterrorism. Therefore, the biosecurity has emerged on the international policies agendas -at the end of the 20<sup>th</sup> century- including other terms such as "**Bio-warfare**", "**infectious diseases**" and "**Bioweapons**" (Gostin, 2006,pp:407-408). This has led to the development of procedures and policies to prevent these threats and maintain health security and safety for individuals and communities.

### B. historical developments of biosecurity and bioterrorism

Over time, both terms biosecurity and bioterrorism have evolved, which is reflected in the historical developments of these two concepts, as indicated by the developments of historical events as follows:

- **In 1972:** The Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, known as the "**Biological Weapons Convention**" was established. It aims to prevent the use and eliminate biological agents as weapons.<sup>ii</sup>

**Figure 01:** anthrax letters postmarked to the United States in 2001<sup>iii</sup>



**Source:** Ryan, J. (2016). *Biosecurity and bioterrorism: containing and preventing biological threats*. Butterworth-Heinemann. p :04

- **In 2001:** The United States was attacked by **Anthrax**, which was used as a biological weapon (Heymann, D. L., Prentice, T., & Reinders, L. T., 2007 p 31.). Since 9/11, there has been a growing concern amongst decision-makers and the public about bio-terrorism as well as other biosecurity threats. A key priority for policymakers has been to prevent what many argue to be low probability, yet high impact bio-attack scenarios by

terrorists—such as the use of a highly pathogenic weaponized substance like anthrax in a major urban centre (Walsh, 2018,p:2) .

- **In 2005:** The concept of biosecurity was included in the objectives of the World Health Organization (**WHO**), reflecting the recognition of its importance in maintaining public health and international safety. (RYAN, 2016, p 04.)
- **In 2007:** The World Health Organization (WHO) in its annual report entitled "A Safer Future: Global Public Health Security in the 21st Century" (Heymann, D. L., Prentice, T., & Reinders, L. T., 2007, WHO, op, cit, p 22) referred to the emergence of major microbial scourges, such as cholera and **smallpox**, which are influenced by various factors, including conflicts.

**Figure 2:** Woman with characteristic **smallpox** (Variola major) lesions about the extremities. Courtesy of the Centers for Disease Control Public Health Library

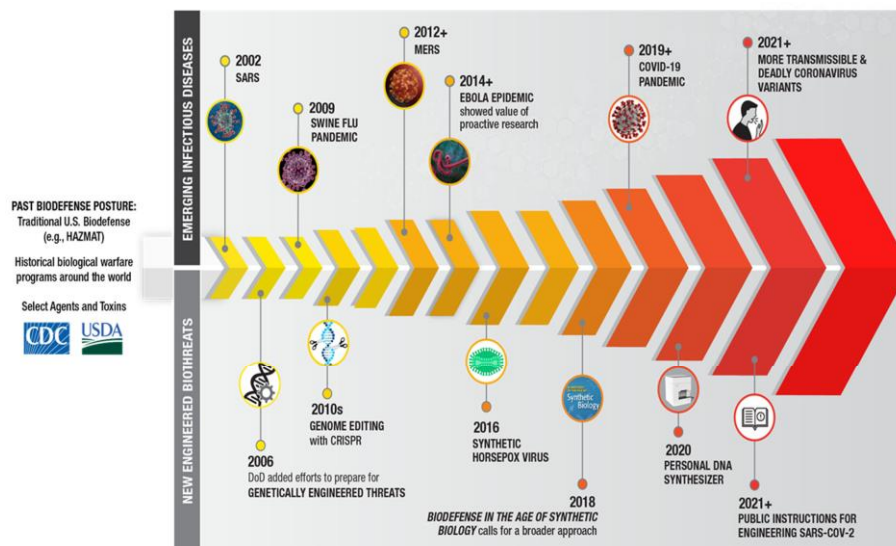


**Source:** Ryan, J. (2016). *Biosecurity and bioterrorism: containing and preventing biological threats*. Butterworth-Heinemann. p:69

- **In 2018:** The World Health Organization adopted the Global Biosecurity Initiative, which aims to strengthen international biosecurity and address biothreats.
- **In 2019:** Recently, many biological threats have emerged, such as the Covid-19 pandemic, which swept the world in 2020. It poses several threats to public health and biosecurity.

- **Post-COVID-19 world 2022:** With the advancements in biotechnologies and genetic modifications such as genome editing with CRISPR-Cas9<sup>iv</sup>, and in the continued evolution of the biological threat landscape, particularly following the COVID-19 pandemic, the capabilities of global biological defense have significantly improved. It has become of utmost importance for major powers worldwide to have the ability to confront an environment contaminated with chemical, biological, or nuclear agents. This importance extends across the costs and risks associated with future biological threats, whether natural or man-made. The summarized developments in the biological threat landscape can be depicted in **Figure 3** below:

**FIGURE 3. EVOLVING BIOTHREAT LANDSCAPE since 2002 to post 2022**



**Source:** 2023 Biodefense Posture Review Center for the Study of Weapons of Mass Destruction, NEWS Aug. 18, 2023.on : <https://bitly.ws/ZoTE>

### 1-3 Conceptual definition and terminological perception of: Biosecurity and Bioterrorism

It is crucial to provide clear definitions and conceptual boundaries for both biosecurity and bioterrorism in order to establish a foundation for understanding their relationship. Additionally, this paper frequently uses other key terms such as **biocrime**, **biothreat**, and **biohazard**. As a result, we must define the difficulties surrounding the study of these terms.

#### 1-3-1 - Definition difficulties of the terms Biosecurity and Bioterrorism:



When attempting to define biosecurity, several difficulties arise, highlighting the complexity associated with defining these terms. Also the complexity includes other terms associated with the biological threats, weapons, and warfare, which was the subject of debate by researchers who confirmed the difficulties of defining the term "biosecurity" in a way that covers the multiple disciplines associated with this term.

"Biosecurity" term refers to a body of procedures and measures, which aimed to protect the environment, communities, and economies from potential biothreats, as infectious diseases, epidemics, bioweapons, bioterrorist threats, and other bio-risks. (RYAN, 2016, op cit:p10).

We can also consider "biosecurity" as another way of sharing societal obligation to protect people from harmful microbes, whether natural or intentional. It traditionally focused on defending against biological weapons and terrorism. However, it now includes natural diseases as well, making the challenge more complex (Walsh, 2018, pp:11-12). This term primarily addresses the current biological threats faced by human societies and is considered a priority by various governments, international institutions, and non-governmental organizations." (Lawrence O. Gostin, 2007,p:3)

In a general sense, the concept of "biosecurity" revolves around a set of measures and precautions designed to protect human and animal life, as well as the environment, from rapidly spreading health threats, irrespective of whether they occur naturally or intentionally. On the basis it is proposed, Biosecurity encompasses a range of preventive actions and swift responses to health crises and challenges.

At second point term, "bioterrorism" refers to the using of microorganisms, animal or plant toxins, genetically modified substances, and chemically altered components by terrorists with the aim to cause damage to individuals, groups, or nations. These challenges explain why the United Nations (UN) Secretary-General argued, **"We need to pay much closer attention to biological security"** (United Nations, 2004,pp:9,10)

Furthermore, biothreats are intended to induce catastrophic effects on animals, plants, humans, and the environment. The techniques employed in bioterrorism include poisoning, infection, and exposure to parasites, viruses, bacteria, fungi, and other perilous biological components.

### 1-3-2 The terminological intersection of the two concepts

In the 21st century, biosecurity, which encompasses a wide range of measures and efforts aimed at preventing the creation of dangerous pathogens for bioterrorism purposes, has become a central and formidable element in global policy-making agendas. Overall, both biosecurity and bioterrorism terms are used in approaches related to catastrophic and intentional health threats, ensuring public safety, and maintaining international stability.



The context and the scope of using the terms "biosecurity" and "bioterrorism" can vary, and expand according to the specific field and circumstances, which each affects one to the other. Also, they depending on the specific field and context in which the speaker is addressing them, "Biosecurity" finds applications in various sectors, including medical, healthcare, environmental, agricultural, food, biological sciences, biotechnology, internal security, and international security. (Colussi, 2015,p12)

Furthermore, "**bioterrorism**" is especially pertinent in military, defense, military technology, safeguarding critical infrastructure, scientific research, and industrial operations involving hazardous biological components, genetically modified organisms, bio-toxins, and other risky biological components and technologies. (Lawrence O. Gostin, 2007, op, cit,p:54). Genetically modified organisms, bio-toxins, and other risky biological components and technologies. Farther than, a range of preventive measures and actions must be implemented to achieving Biosecurity, including the monitoring and early detection of biothreats, (Collier, 2008, p:13) efficient planning and responses to epidemics, infectious diseases, bioweapons, and bioterrorism.

In another way, it also encompasses the safeguarding of borders, ports, laboratories, and essential biological facilities, and the regulation of hazardous biological components, genetically modified organisms, bio-toxins, medical waste, and more. Biosecurity encompasses safeguarding borders, ports, laboratories, essential biological facilities, and the regulation of hazardous biological components, genetically modified organisms, biotoxins, medical waste, and more. It relies on international cooperation and coordination among nations, institutions, and international organizations. This entails the exchange of information, expertise, technologies, and resources pertaining to present and future biological situations and challenges. It serves to enhance capacities at the national, regional, and global levels in addressing biothreats.

As a result, biosecurity is an integral component of global health security, necessitating collaboration and partnership across diverse sectors and between local and global communities to ensure the comprehensive protection of public health, environmental and economic systems, and international security.

## **2- Secondly: The complex relationship between biosecurity and bioterrorism and the nature of their overlap.**

Before we proceed to the nature of the relationship between biosecurity and bioterrorism and their interference, we must primarily refer to several important theoretical points that require scientific clarification, as follows:

### **2-1. The academic debates regarding the intricate relationship between biosecurity and bioterrorism**

Several academic discussions have been raised regarding the fields of biosecurity and bioterrorism, and they have extended to academic, political, and

scientific domains. These discussions played a crucial role in delineating what is considered biothreats and dangers, whether the biological factor poses a security issue or a public health concern.

For instance, consider the deliberate or unintentional release of a severe pathogen like smallpox, which could result from a biological threat and may be considered as a criminal act. The concept of biosecurity, in turn, somewhat hinges on the extent to which biological agents are "secured" (Walsh, 2018, PP:10-11)

The academic definitions that emerged in the mid-nineties reflect what is known as expanding the concept of "National Security" to the idea of preventing or prosecuting wars between states, and including the security of individuals in this state. Supporters of human security argue that "National Security" includes the security of people in their countries from political violence (terrorism, civil wars, and state collapse), economic vulnerabilities, and even diseases and natural disasters, and this is what Copenhagen School researchers (by Barry Buzan and others) focus on that the problem of "national" security turns out to be a systemic security problem in which individuals, states and the system play a key role, and in which economic, social and environmental factors are no less important than political and military factors. (Buzan, 2008,p :112).

Koblenz argues that biosecurity has determined mining in many specializations, consequently, there are 04 definitions competing to use and describe this term. Primarily biosecurity is defined as animal, and plant health and biodiversity threats, which indirectly influence human health.

In another way, it defines as a new scoop of security that emerged with the rise of the term "bioterrorism". (Koblentz, 2010 ,p :104) More than, biosecurity is defined as a control operation of dual-use biological research, which has a legitimate scientific purpose (such as vaccine research) but can be misused, thus posing a biothreat to public health and national security.

Finally, Koblenz defines biosecurity in the fourth point (adopted by the U.S. National Academies of Sciences) as a "**protection from accidental or inappropriate or deliberate and malicious use of dangerous biological agents or biotechnology, including the development, production, stocking, and use of bioweapons, as well as the spread of new and emerging diseases**"( Koblentz, 2010,p:110).

In light of what has been mentioned previously, analyzing the various definitions presented by Koblenz, leads us to say that it becomes evident to address the complexities of biosecurity. These definitions emphasize the need to control and regulate dual-use biological research.

As a result, the broader meaning of Biosecurity is "**a strategic and integrated approach that includes policies and regulatory frameworks analyzing and managing risks in the food safety, animal life, and health, plant life and health sectors, including associated environmental risks**" (Gronvall, 2017,p:37).

## **2-2. Perspectives of IR theories for understanding the relationship between "biothreat environment" and the production of "biological threat"**

In general, there are different opinions on what constitutes a "biological threat." Therefore, it is important here to briefly consider two theoretical perspectives that are considered among the major trends in **realist** and **constructivist** IR theories, on the basis that these threats are a deception that is relevant to how psychologists, intelligence analysts, and policymakers determine what constitutes a "biological threat that is socially constructed according to natural and objective conditions." Or is it An unforeseen security given that is socially constructed according to varying inter-subjectivism conditions, (It can certainly be argued that there are other theoretical perspectives relevant to how we understand the nature of "biological threats," such as liberal perspectives, critical security studies (CSS) according to the Copenhagen School and beyond human security approaches). We will limit the boundaries of the discussions to the two realism and constructivism perspectives as follows.

**A. Realism perspectives;** The prevailing views among classical realists emphasize that in the absence of a global government, international interactions between nations are shaped by anarchy. States look to others for security in a turbulent world with few legally enforceable agreements. Competition for power results from this and the international system's structure is ultimately decided by this. Thus, rather than being threatened from the inside, state survival is fundamentally a competition between states (see (Morgenthau, 1967); (WALTZ, 2018)). Later, with the rise of a new generation of IR researchers (neo-realists), this approach was "softened" slightly since these scholars considered domestic considerations as important to how states responded, even though they agreed with their classic realist colleagues that the international system governs how states behave. (Burchill, 2022,p:96). In particular, during the Cold War period, states were considered the primary source of the emergence and spread of biological threats, as the biothreat environment was clearly represented by the Soviet Union and the United States of America. Realistic perspectives can help understand how different national security policies are made to manage biological threats and explain some of the processes of Strategic decision-making when establishing biological warfare programs in that period (Walsh, 2018,p:23).

**B. Constructivism perspectives** are another useful approach in describing the post-Cold War bio-threat landscape because of non-state actors; Constructivist propositions provide an understanding of the changing risks and ensure that national security policy is not sufficient to manage this new set of challenges. Alexander Wendt suggests adopting constructivist and social theoretical perspectives in the field of international relations, in which threat is considered a social given that can be shaped and constructed according to collective identities and ideas by non-state and non-governmental actors after it was limited only to states, (Wendt, 1999. pp:123-124) Such as individuals,

violent armed groups, and bioterrorists who influence international politics and compete with states in using the biothreat environment in a more extreme and violent manner.

Based on the foregoing, we recall Wendt's famous saying to describe the post-Cold War international order by saying that: " **Anarchy is what states make of it**" (see Wendt, 1992), Here, in parallel, we say that:

**" Biothreat is what extremist groups and non-state actors make of it ".**

### **2-3. Exploring "Bioweapons" and "Bioweaponization" concerns as interpretative models**

in-depth monitoring of the issues of biosecurity and comprehensive examination of the Bioweapons and Bioweaponization as explanatory models, reveals the nature and essence of bioterrorism as a real threat to global biosecurity, where viruses and biological agents become biological weapons in dangerous and irrational groups and individuals, posing a danger and threat to countries, societies, people and even to the world. All in all, a clear relationship between bioterrorism as a Genuine national and global biosecurity threat security is evident, which requires exploring the various aspects related to their use It also necessitates an exploration of various aspects related to its utilization.

#### **3.1 Bioweaponization as a new threat to biosecurity**

The concept of "Bio-weaponization" or "Weaponization of Biology" (It is derived from the weight of **securitization, militarization, and globalization ...etc**) refers to the utilization of biological sciences, and their related technologies for the explicit purpose of creating and advancing biological weaponry, which can be deployed in warfare or acts of terrorism (Carus, 2001,p:9)

This encompasses a spectrum of techniques, including genetic modification, the manipulation of viruses and bacteria, the engineering of biotoxins, and the manipulation of bioactive compounds with the potential for efficient transmission and dispersion. Additionally, bioweaponization poses a profound and multifaceted threat to both international security and public health. The repercussions of such activities can result in a health crisis, substantial human casualties, and severe economic ramifications (Defense/USA, 2023p63).

Addressing and mitigating this threat necessitates an exceptional degree of proficiency and specialization within the realm of biological sciences and biosecurity. At the international level organizations such as the Chemical Weapons Convention (CWC) and the Bioweapons Convention (BWC), are dedicated to preventing the proliferation of bioweaponization. They are instrumental in providing the legal and technical framework to counter this specific category of threats. Furthermore, several countries are actively engaged in the development of procedures and technologies for the detection, prevention, and response to biothreats should they materialize. (Bonin, 2007,p:293)

Based on the previous points we can define Weaponization as a term that pertains to the procedures required for the purification, appropriate sizing, stabilization, and optimization of biological agents for effective dissemination. due to the vulnerability of biological agents to environmental degradation, not only during storage but also upon application (Bonin, 2007, Ibid), As an example, anthrax spores released into the environment may remain viable for decades, whereas plague bacterium may survive for only a few hours (RYAN, 2016,p:18).

### **3.2- In the use of bioweaponization How does a bioweapon become a biohazard or not?**

Not every viral or biological agent can be used as a weapon. Thus, an infectious agent's potential to be utilized as a weapon is one of the factors taken into consideration when assessing its hazard or risk. *Bacillus anthracis*, for instance, is a spore-forming bacterium that causes the toxin-mediated disease state known as anthrax. Depending on the route of exposure, anthrax can have three distinct pathogenesis: gastrointestinal, cutaneous, and pulmonary. Environment-found *Bacillus anthracis* is a naturally occurring bacterium. But a handful of bacterially-rich farm soil is not "weapons grade." Producing huge amounts of anthrax spores requires significant manipulation of bacteria, including mass manufacturing, filtration, and culture. But it's crucial to remember that biological agents don't always need to be used as weapons. (RYAN, 2016,pp :26-27)

Consequently, biological agents do not necessarily need to be weaponized to pose a biothreat, biocrime, or bioterrorism, thus, Bioweaponization employed in several wars and conflicts throughout history, with some famous examples:

- -The Japanese-Chinese Biowarfare (1937-1945): Japanese forces used bioweapons in opposition to Chinese citizens, developing various infectious diseases such as plague, cholera, and smallpox and releasing them on the population.



**Source:** Coleman, K. (2005). *A history of chemical warfare* (pp. 1-198). New York: Palgrave Macmillan. <https://bitly.ws/ZwTv>

- **Soviet Bioweapons Program (1972-1992):** The Soviet Union had a secret program for the development of bioweapons, producing several dangerous strains of infectious diseases such as smallpox, anthrax, and plague.



**Source:** Guillemin, J. (2006). Scientists and the history of biological weapons: A brief historical overview of the development of biological weapons in the twentieth century. *EMBO reports*, 7(S1), S45-S49. <https://bitly.ws/ZwSS>

- **Anthrax Attacks on the United States (2001):** In this incident Postal letters containing Anthrax spores were distributed in the USA, resulting in 22 people contracting the disease, of whom 5 died (Bozinis, 2021,p:3). US and Allied forces during the war with the Taliban regime in Afghanistan discovered that the terrorist organization al-Qaida was trying to develop biological weapons. Although al-Qaida has suffered a significant loss in its operational military power, there are serious suspicions that it is trying to acquire biological weapons even today. (for more see ;(WASHINGTON, 2009)
- **Covid-19 Pandemic** Daniel Gerstein, believes that there is no scientific evidence that COVID-19 was genetically engineered. However, this doesn't absolve humans of responsibility for the pandemic. Human activities, such as disrupting environmental fluids and enhancing species mixing in places like the wet market in Wuhan, as well as experimenting with pathogens in laboratories, all contribute to the threat.<sup>v</sup> More so, COVID-19 and naturally occurring diseases stand as stark reminders of the devastation that diseases can unleash, underscoring the critical need for thorough preparedness in the face of a potential bioterrorism attack. (Brands, 2020,p222).

## Conclusion

In conclusion, the field of biosecurity, bioterrorism, and the evolving landscape of infectious diseases pose significant challenges to the global community. Whether through natural occurrences or deliberate actions, the threat of biological agents cannot be underestimated.

Vigilance, and international cooperation, are essential elements in safeguarding our health, environment, and future. The lessons learned from past events and ongoing research must guide us toward a more secure and resilient world.

The threats and challenges surrounding the relationship between biosecurity and bioterrorism concepts can be summarized in many vital threats that could face societies, countries, and the world, including:

- Exploitation of pandemics and contagious diseases: Examples include the coronavirus (COVID-19), Ebola, influenza, cholera, tuberculosis, malaria, yellow fever, Lassa fever, and diseases transmitted by insects and parasites.
- bioweaponry Development: involves the use of living organisms or for potential bioterrorist attacks, such as anthrax, smallpox, and botulinum toxin.
- Agricultural dilemmas: These encompass challenges related to plant and animal pests, diseases, and viruses that can disrupt agricultural productivity, food production, and food security.
- Biopollution: Arising from various sources such as medical, industrial, agricultural, nuclear, and chemical waste, which poses threats to public health, the environment, and biosecurity.
- Hazards associated with advanced bioresearch and biotechnology: This category deals with biotechnological practices and applications that have the potential to impact public health and biosecurity, including genetically modified organisms, emerging viruses, and high-capacity DNA technologies that could be exploited for bioterrorism purposes.

In order to confront these threats, several approaches are essential, this includes:

1. enhancing national and international surveillance systems, bolstering healthcare infrastructure,
2. promoting scientific research, and fostering global cooperation to develop response strategies.
3. The measures should be taken to mitigate the ecological and environmental factors contributing to the emergence of these threats, such as deforestation and habitat destruction.



4. Public awareness and education about biosecurity and pandemic preparedness are also crucial components of a comprehensive strategy,
5. enhancing national, regional, and international capabilities to address them. This involves strengthening cooperation and coordination among countries, institutions, civil society, and the private sector,
6. and the exchange of bioinformation, expertise, biotechnologies, and resources.

### Footnotes:

<sup>i</sup> The prefix "**Bio**" associated with the term "vital," as mentioned by Claude Lafon in a book titled, "**From Biology to Ethics**," which includes several fields use the prefix "bio" and other related terms, as "biologie, biotechnologies, biomédecine, biothérapies...ou encore biosphère, biodiversité, bioénergie, biomatériaux, biodégradable... biométrie, bioinformatique... bioéthique, biopolitique, biopiratage... bionique, bioterrorisme, biosécurité...etc." For more information . Lafon, C. (2006). De la Biologie à la Bioéthique. Ellipses.

<sup>ii</sup> **Article 1** of Biological weapons convention refers: 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. (GA/UNO, Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, 1972, Geneva, p 01 )

<sup>iii</sup> **This letter**, sent on October 5th, 2001, the letter was deposited in a mailbox close to Princeton University in Trenton, New Jersey. It bore the address of Senator Tom Daschle and had a return address suggesting it came from a fourth-grade class at Greendale School in Franklin Park, New Jersey (it noted that there is no such school).

<sup>iv</sup> **CRISPR/Cas9** is a gene-editing technology which involves two essential components: a guide RNA to match a desired target gene, and Cas9 (CRISPR-associated protein 9)—an endonuclease which causes a double-stranded DNA break, allowing modifications to the genome. A well-known one is called CRISPR-Cas9, which is short for clustered regularly interspaced short palindromic repeats and CRISPR-associated protein 9. To read more about this, look at the link: What is CRISPR/Cas9? <https://bitly.ws/ZoNX>

<sup>v</sup> a researcher and political scientist at the RAND Corporation, he formerly served as the Deputy Under Secretary (Acting) and Deputy Assistant Secretary in the Science

and Technology Directorate within the U.S. Department of Homeland Security from 2011 to 2014.

## References and bibliography:

1. Bonin, S. (2007). *International Biodefense Handbook : An Inventory of National and International Biodefense Practices and Policies*. . ETH Zürich: Center for Security Studies (CSS).
2. Bozinis, A. I. (2021). Bio-Hybrid Threats and Strategic Biosecurity in the Age of Bio-Globalization: The Case Study of Biological Weapons and Bioterrorism. *American Journal of Applied Sciences*.
3. Brands, H. &. (2020). *COVID-19 and world order: The future of conflict, competition, and cooperation*. Johns Hopkins University Press.
4. Burchill, S. L.-S. (2022). *Theories of international relations*. Bloomsbury Publishing.
5. Carus, W. S. (2001). Bioterrorism and biocrimes: The illicit use of biological agents since 1900. DC: *Center for Counterproliferation Research*. National Defense University, 56p.
6. Colussi, I. A. (2015). Synthetic biology as a new threat to biosecurity. Is there a road to suitable governance? In C. M. Romeo Casabona, pp. 65-110.
7. Collier, S. J., & Lakoff, A. (2008). The problem of securing health. In *Biosecurity interventions: global health and security in question*. Columbia University Press. (pp. 7-32).
8. Defense/USA, D. o. (2023, 10 11). *2023 BIODEFENSE POSTURE REVIEW*. Récupéré sur [media.defense.gov: https://media.defense.gov/2023/Aug/17/2003282337/-1/-1/1/2023\\_BIODEFENSE\\_POSTURE\\_REVIEW.PDF](https://media.defense.gov/2023/Aug/17/2003282337/-1/-1/1/2023_BIODEFENSE_POSTURE_REVIEW.PDF)
9. Gostin, L. O. (2006). Biosecurity under the Rule of Law. *Case W. Res. J. Int'l L*, 38, 437.
10. Heymann, D. L., Prentice, T., & Reinders, L. T. (2007). *The world health report 2007: a safer future: global public health security in the 21st century*. Genève: World Health Organization.
11. Jadidi, M. (2016, May 10). . Bioethics and the stakes of future philosophy. *Mouminon Without Borders*.
12. Lafon, c. (2006). *De la Biologie à la Bioéthique*. Paris: Ellipses Edition Marketing S. A.
13. Lawrence O. Gostin, D. P. (2007). Biosecurity under the Rule of Law, Case Western Reserve. *Journal of International Law, Volume 38,(Issue 3 )*.
14. Reece, J. B. (2016). *Principles of Biology II ()*. Valdosta : Valdosta State University.
15. RYAN, J. (2016). *Biosecurity and Bioterrorism Containing and Preventing Biological Threats, , Elsevier, (2. edition, Éd.) USA: Cambridge*.
16. United Nations. (2004). *High-level Panel on Threats, Change, & United Nations. Department of Public Information. A More Secure World: Our Shared*

*Responsibility: Report of the High-level Panel on Threats, Challenges, and Change.* United Nations Pub. Récupéré sur <https://www.un.org/peacebuilding/content/more-secure-world-our-shared-responsibility-%E2%80%93-report-high-level-panel-threats-challenges-and>

17. Walsh, P. F. (2018). *Intelligence, biosecurity and bioterrorism*. London: Springer.
18. WASHINGTON, T. W. (2009, November 23). *national security council for Countering Biological Threats*. Récupéré sur [obamawhitehouse.archives.gov: https://obamawhitehouse.archives.gov/sites/default/files/National\\_Strategy\\_for\\_Countering\\_BioThreats.pdf](https://obamawhitehouse.archives.gov/sites/default/files/National_Strategy_for_Countering_BioThreats.pdf)
19. Wendt, A. (1992). Anarchy is what states make of it: the social construction of power politics. *International organization*, 391-425.
20. Wendt, A. (1999.). *Social theory of international politics* (Vol. Vol. 67). Cambridge University Press.