



**Arab American University
Faculty of Graduate Studies**

**The Role of the International Law in the Environmental
Protection in the Occupied Gaza Strip**

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**This thesis was submitted in partial fulfilment of the
requirements for the Master's degree in International Law
and Diplomacy**

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Thesis Approval

The Role of the International Law in the Environmental Protection in the Occupied Gaza Strip

By

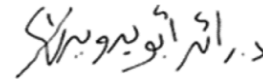
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Declaration

I declare that, except where explicit reference is made to the contribution of others, this dissertation is substantially my own work and has not been submitted for any other degree at the Arab American University or any other institution.

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Dedication

To my dearest Mum and Dad, In the quiet of my heart, where words fall short, your unwavering support and boundless love have been the pillars that held me up through this academic journey. You've been my guiding stars, lighting the path to knowledge and understanding. With heartfelt gratitude, this thesis is dedicated to you.

To my precious sisters, Aya, Ayat, Bayan, Alaa, in every chapter of my life, you've added your own beautiful verses. Your encouragement and sisterly love have been the gentle breeze that carried me forward. With love as deep as the ocean and as vast as the sky, I dedicate this thesis to you.

To my cherished brothers in law, Naiel, Jamal, Sami, Moumin, thank you for always being there in every chapter of my life

To my closest friends, through laughter and tears, you've been my steady companions. Your belief in me has been the anchor that kept me grounded. With appreciation for your unwavering friendship, this thesis is dedicated to you.

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With simplicity and sincerity, I offer this dedication to those who have shaped my academic journey, inspired my growth, and shared in my joys and challenges. Thank you for being the tapestry of support that makes this achievement possible.

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Abstract

This thesis thoroughly examines environmental violations in the Gaza Strip, covering the environmental situation, legal frameworks, and global responsibilities. It delves into Israeli violations, including pollution, habitat destruction, and resource depletion. The thesis also discusses how the blockade affects the environment. Furthermore, it analyzes international environmental laws, exploring the legal foundations for environmental protection, where it investigates relevant treaties, conventions, and agreements, as well as international humanitarian law and environmental rights. The thesis also examines mechanisms in international law designed to protect the environment. Additionally, it addresses legal responsibility for violations of environmental protection rules in the Gaza Strip, explaining the concept of international responsibility and outlining the associated legal principles and obligations. The study assesses the legal implications of the Israeli occupation on the environment in Gaza, and it discusses the responsibilities of states and third parties in addressing Israeli violations. In conclusion, this study offers a comprehensive results and recommendations aim to contribute to the preservation of the environment in the Gaza Strip and advocate for greater accountability in addressing environmental violations, for instance, there is a lack of accurate databases and information regarding Israeli environmental violations in Palestine and deficiencies in the efforts made to monitor and document the occupation's environmental violations in the Gaza Strip, which requires work on effective monitoring and documentation to build and archive an accurate information base for Israeli violations of the Palestinian environment in general and in the Gaza Strip in particular, and that this documentation be supported by evidence, evidence and witness testimonies in order to prosecute the occupation for its crimes whenever possible.

Key words: International mechanisms, International responsibility, Israeli violations of the environment, the Gaza Strip, environmental protection, International humanitarian law.

Table of Contents

Thesis Approval	I
Declaration	II
Dedication	III
Acknowledgment	IV
Abstract	V
Introduction	1
Introductory Chapter	9
1. The Reality of Environmental Violations in The Gaza Strip	16
1.1 Internationally Prohibited Weapons Used Against The Gaza Strip	17
1.1.1 White Phosphorus:	18
1.1.2 Dime Bombs:	19
1.1.3 Electromagnetic Weapons:	19
1.1.4 Thermobaric Bombs and Vacuum Pressure Bombs:	19
1.2 Israeli Violations of The Environment in The Gaza Strip and Its Effects:	20
1.2.1 Water Pollution:	20
1.2.2 Pollution of Sea and Beach Water and Sanitation Problems:	22
1.2.3 Solid Waste:	24
1.2.4 Soil Pollution and Damage to Agricultural Lands	25
1.3 The Effects of the Blockade on the Environment in The Gaza Strip:	26
1.3.1 The Impact of The Blockade on Access to Basic Facilities:	27
1.3.2 The Impact of The Blockade on The Population:	29
1.3.3 The Impact of The Blockade on The Recovery of The Environmental Situation in The Strip:	31
2. Legal Basis of International Environmental Law	37
2.1 Sources of Environmental Protection in International Law:	38
2.1.1 Environmental Protection within the Framework of International Conferences:	39
2.1.2 Environmental Protection within the Framework of International Agreements:	41
2.1.3 Environmental Protection Within The Framework Of International Humanitarian Law:	44
2.1.4 International Humanitarian Agreements That Directly Protect the Environment:	44
2.1.5 International Agreements That Provide for The Protection of The Environment Indirectly:	49
2.1.6 International Agreements on Weapons	55
2.2 Mechanisms of Environmental Protection in International Law	64
2.2.1 The Concept of Preventative Protection for the Environment in International Humanitarian Law	64
3. The Legal Responsibility Related to The Violation of Environmental Protection Rules in International Law in The Gaza Strip	76

3.1 The Concept of International Responsibility	76
3.1.1 Theories of International Responsibility:	78
3.1.2 Conditions for international responsibility for environmental damage:	81
3.2 The legal implications of the Israeli occupation, and the legal implications on states and third parties	85
3.2.1 The legal implications of the Israeli occupation:	85
3.2.2 The legal implications of states and third parties:	90
3.2.3 International efforts to protect the environment in the besieged Gaza Strip	94
Results	99
Conclusion	100
Recommendations	101
References	102
Appendices	114
ملخص	119

Introduction

The environment is the common heritage of humanity and everyone must protect it in war and peace. Many conventions and protocols have been drafted so far on an international scale to protect the environment. The environment has also become an important part of the development issue in any society, as the environment is considered one of the main pillars of sustainable development, which in addition to the environment and the economy includes social aspects. However, as a result of military development, the environment is exposed to continuous violations that pose a great threat to the ecosystem, and one of the most prominent international examples of environmental damage as a result of the military occupation is the Gaza Strip. Where the Israeli occupation authorities' military actions in Gaza and the use of internationally forbidden weapons caused a serious environmental impact.

The occupation's military operations in Gaza are not limited to humans, but also to the environment, as they have dropped more than several million kilograms of bombs and shells that carry dangerous radiation into the environment, polluting the air and portending dire consequences in the future, in addition to tanks and bulldozers. It attacked major agricultural and natural landscapes, destroying vegetation cover, while the Israeli occupation purposefully destroyed infrastructure, cut water arteries, and targeted its wells, sewage networks, and power station.

Research Problem:

Israeli violations against the Gaza Strip environment, which developed as a result of the blockade and wars imposed on Gaza, are among the most notable examples of environmental violations throughout the world. which pose a significant threat to both the natural and human aspects of life in the region, as well as the environmental resources there. these violations caused long-term consequences. For instance, the use of prohibited weaponry such as White

phosphorus¹ clusters and flechette bombs² during the attacks has resulted in continuous pollution of the environment, with the smoke from explosions contaminating the landscape for extended periods. Additionally, the destruction of infrastructure has had severe implications, including the depletion of water sources and the deliberate targeting of agricultural areas, leading to the loss of vegetation and a disruption of the ecological balance. The detrimental effects of these weapons on the environment are profound, encompassing soil and water pollution, the destruction of ecosystems, and harmful repercussions for plant and animal life. Furthermore, Israeli policies intentionally target crucial environmental infrastructure within the Gaza Strip, resulting in the destruction of essential facilities like water treatment plants, power stations, and waste disposal sites. Which negatively impacts the quality of life, public health, livelihoods, and overall environmental sustainability within the region. There is an unstoppable continuation of the Israeli environmentally destructive policy in the Gaza Strip, and therefore it was necessary for the researcher to shed light on these ongoing violations and extrapolate international legal means that may limit these environmental damages, From this issue, various questions arise, which are outlined as follows:

Main question:

- What are the provisions of international humanitarian law regarding the protection of the environment, and what does this protection entail?

Sub-questions:

- How the blockade and wars in the occupied Gaza Strip influence the local environment, and what potential strategies exist to alleviate the adverse environmental repercussions?

¹ Strict regulations govern the use of incendiary weapons that contain white phosphorous. Except when the military target is obviously and far away from civilians, it is forbidden to use such bladed weapons against any military target in civilian populated areas. It's also strictly forbidden to use incendiary weapons from the air to attack military targets surrounded by civilians. These are the restrictions outlined in Convention on Conventional eapons Protocol III.

ICRC, *Incendiary weapons and cluster munitions: Constraints under international humanitarian law*, Geneva, 17 January 2009, <https://www.icrc.org/ar/doc/resources/documents/interview/weapons-interview-170109.htm>, accessed 17 May 2025

² The 2008 Convention on Cluster Munitions comprehensively prohibits the use of these munitions, including their use, production, stockpiling, and transfer. Convention on Cluster Munitions, 30 May 2008, entered into force 1 August 2010, *United Nations Treaty Series*, vol. 2688, p. 3

- What mechanisms for accountability can be utilized within international law to hold Israel responsible for these transgressions, and what obstacles hinder the implementation of international environmental protection regulations in the besieged Gaza Strip?
- What is the global responsibility concerning the violation of environmental protection regulations?
- What are the most prominent international efforts to protect the environment in Gaza Strip?

Literature Review:

- **Boughanem, Ahmed, The effectiveness of international monitoring mechanisms for violating the rules of international humanitarian law, Djillali Liabes, Algeria, 2020**

This study attempts to identify the conceptual framework of international humanitarian law and the most important features and characteristics that distinguish it from some other laws, then search for the most important control mechanisms for the violation of its rules and their effectiveness, as well as to search for the most important obstacles that prevent the necessary effectiveness of these mechanisms. This study revolved around international monitoring mechanisms, which also constitutes a significant focus of this thesis.

Within this study, the researcher explored a variety of subjects. It delved into the essence of international humanitarian law, examining its concept, characteristics, principles, scope of application, and its interconnections with other branches of international law. This was done to establish a connection between these mechanisms and the regulations outlined in international humanitarian law. Subsequently, the researcher tackled the mechanisms governing international non-criminal and criminal oversight of breaches of international law. Furthermore, it addressed the key obstacles hindering these mechanisms, thus contributing to the formulation of the theoretical framework for this thesis.

- **Al-gha, Mohammed, Environmental management in the Gaza strip, The Islamic University of Gaza, Palestine, 2018**

The environment in the Gaza Strip has been completely destroyed since its occupation by Israel in the 1967 war. The area of the Gaza Strip is 360 km². The Palestinians (900,000 people) live on 50% of this area, and the Israeli settlers (3500 people) live on the other half.

Existing basic environmental infrastructure has been neglected by the Israeli military authorities during the occupation. This article summarizes the environmental problems in the Gaza Strip, and necessary new facilities have not been built. This article discusses approaches, measures, and steps for an environmental management and legislation in this area. Serious problems include noise pollution, air pollution, groundwater pollution, soil salinization, high-voltage electricity, possible radioactive hazards, and the spread of Norwegian rats. The basis on which the institutions to protect the environment must be established are identification, evaluation, and analysis of environmental problems, methods of protection, and the experience of the other societies. The experience of the other societies will help considerably in developing an environmental management policy for the Gaza Strip. The new policy is the product of strong legislation.

This study is directly relevant to the primary goal of this thesis, which is to shed light on the environmental conditions in the Gaza Strip in the context of Israeli occupation violations. It provided a concise overview of the Gaza Strip's environmental challenges and examined approaches, strategies, and legal measures for environmental management in this context. It was a very helpful and direct source that helped to conduct this thesis.

- **Qabosh, Nawal, International responsibility for damage to the environment during armed conflicts and challenges to the principle of military necessity, Larbi Ben M'hidi university, Algeria, 2018**

Recent armed conflicts' destruction of the environment demonstrated the necessity for strong legal foundations to protect this unseen war victim. This study attempts to present a set of legal debates surrounding international responsibility for these damages, in light of the challenges to the principle of military necessity, which simultaneously serves as a safeguard for environmental protection and a legal justification that, if misapplied, could result in the eradication of the provisions of international humanitarian law devoted to humanitarian considerations.

The study of Nawal Qabosh, is concentrated on the issue of international accountability for environmental harm in times of armed conflicts, a primary subject of this thesis. It presented this topic in a comprehensible manner, facilitating the reader's grasp of the legal foundation and international liability associated with such damages.

- **Bashir, Hisham, Environmental Protection in the Light of the Provisions of International Humanitarian Law, 1st Edition, National Center for Legal Publications, Cairo, 2011**

This book presents a study that focuses on defining the nature of the rules and provisions related to environmental protection in international humanitarian law and assessing the extent to which these rules and provisions protect the environment in all of its forms and manifestations during war and armed conflict. Organisms; The book is divided into three chapters that address global environmental concerns, objective environmental protection in international humanitarian law, and organizational environmental protection in international humanitarian law.

This book significantly contributes to the groundwork and presentation of this thesis since the subject matter closely aligns with the central theme of the research which is environmental violations. It primarily aims to elucidate the environmental regulations and stipulations within the global arena. It also delves into how these rules and regulations offer safeguards for the natural environment in all its various forms during times of war and conflict. This directly pertains to the research examination of Israeli environmental violations in the Gaza Strip and the strategies for protecting it from an international legal perspective.

Comment on previous studies

Through exploring previous studies as literature review for this thesis, it can be commented on those studies as follows:

These studies utilized an analytical-descriptive approach, which aligns with the methodology employed in this thesis. However, they differ from this thesis in that each focuses on a specific topic. For instance, one study exclusively addressed the issue of environmental protection in international law, while another delved into accountability mechanisms. Additionally, a separate study concentrated on environmental management in Gaza. In contrast, this thesis presents a comprehensive examination of these subjects within a single study, analyzing the legal frameworks for environmental protection in the besieged Gaza Strip under the purview of international law. It also highlights the most prominent environmental violations perpetrated by the Israeli authorities in the Gaza strip.

Methodology:

This study will be based on a descriptive-analytical methodology, involving the collection and examination of pertinent data from various sources such as international human rights conventions, international humanitarian law, especially international environmental law and its interpreters, academic research and journals, trusted documents, reports, and studies. Additionally, a comprehensive review of the prominent environmental violations in the Gaza Strip will be conducted.

This methodology was selected due to its suitability in attaining the intended outcomes and addressing the research questions in a scientifically rigorous manner, in order to provide a comprehensive and objective analysis of the subject matter.

Importance:

This study was conducted based on the importance of preserving the environment and the necessity of the human right to live in an appropriate and protected environment, even in light of military conflicts. From this point of view, this study holds significant importance in several aspects:

First, it has academic significance as it addresses the issue of environmental protection within the context of international law, which is a contemporary topic that has not been extensively explored. Specifically, the study focuses on the environment in the Gaza Strip, where research on environmental violations in the light of international law is scarce. By shedding light on these violations, the study contributes to understanding the implications of environmental infractions and the resulting international responsibility, moreover, it helps to fill the knowledge gap in this context, in addition to provide the political and human rights decision-makers, whether at the international or Palestinian national level with some international legal tools to be implemented to limit Israeli environmental violations in the Gaza Strip and other occupied territories.

Second, the study carries practical importance. The environment is considered a shared heritage of humanity, necessitating a thorough examination of the mechanisms for its protection under international humanitarian law. It is crucial to clarify the international responsibility that arises from violations against the environment. This is particularly relevant as every individual has the right to live in a clean and sustainable environment, which is fundamental to their well-

being. However, the environment has suffered significantly due to military advancements and conflicts across various regions, notably in the Gaza Strip, which frequently becomes the target of Israeli aggression. Consequently, the environment in the Strip has been extensively damaged, representing a blatant violation of human rights.

Limitations:

1. The research focuses primarily on International Humanitarian Law and international regulations concerning environmental protection, as there are several international conferences and agreements that have been analyzed in this thesis can be summarized as follows: Stockholm Conference of 1972, Nairobi Conference of 1982; Rio de Janeiro Conference of 1992; Johannesburg Conference of 2002, Vienna Convention for the Protection of the Ozone Layer, United Nations Framework Convention on Climate Change, Convention on Biological Diversity, Basel Convention, Basel Convention, Convention on the Prohibition of Military or any Hostile Use of Environmental Modification Techniques of 1976, Additional Protocol I of 1977 to the four Geneva Conventions of 1949, The Forth Hague Convention of 1907 on respecting the laws and customs of war on land, The Fourth Geneva Convention for the Protection of Civilian Persons in Time of War, Convention for the Protection of Cultural Property in Armed Conflict of 1954, Additional Protocols I and II of 1977 to the four Geneva Conventions of 1949, International Agreements on The Prohibition of Use; and the International agreements on the comprehensive ban of some weapons.
2. The time scope of the study will focus primarily on the periods following the wars and attacks on the Gaza Strip since the imposition of the blockade in 2006, as these events were strongly linked to environmental violations. However, there are no specific restrictions regarding the time frame, allowing for a comprehensive analysis of the topic.
3. The spatial scope of the research is confined to the Gaza Strip, a geographically distinct region characterized by its diverse natural landscape. This area has experienced multiple environmental violations due to repeated Israeli aggression. It is worth noting that these geographical boundaries of the research, which are limited to the Gaza Strip, do not preclude generalizing its results to the rest of the occupied Palestinian territories and other similar international cases.

Research Plan:

The research is divided into 3 chapters as follows;

Chapter 1: The environmental situation in the Gaza Strip.

Section 1.1: Internationally prohibited weapons that were used in the Gaza Strip.

Section 1.2: The most significant Israeli environmental violations in the Gaza Strip.

Section 1.3: The effects of the blockade on the environment in the Gaza Strip.

Chapter 2: The legal background of international environmental law.

Section 2.1: The sources of environmental protection in international law.

Section 2.2: international humanitarian law and environmental rights.

Section 2.3: Mechanisms of environmental protection in international law.

Chapter 3: The legal responsibility related to the violation of environmental protection rules in international law in the Gaza Strip.

Section 3.1: The concept of international responsibility.

Section 3.2: The legal implications of the Israeli occupation, and The legal implications for states and third parties of Israeli violations.

Section 3.3: International efforts to protect the environment in the besieged Gaza Strip

Finally comes the conclusion and recommendations.

Introductory Chapter

In this portion, the researcher explores the concept of the environment, including its different forms, environmental pollution, it is critical to have a comprehensive understanding of various aspects in order for the legal system to effectively intervene and protect the value of environmental protection. This includes understanding the concept of the environment, as well as its definition and scope.³ Recognizing the various types of environments provide a broader perspective on their distinct characteristics. Furthermore, understanding the concept of environmental pollution is necessary for accountability strategies. Furthermore, investigating the historical development of environmental protection allows for a more in-depth understanding of environmental preservation. briefly, these insights enable informed legal interventions that uphold and promote the importance of environmental protection. Finally, it provides an overview about the Gaza Strip.

The concept of the environment:

Given that the term "environment" is used in a variety of fields and that the number of concepts being studied has increased, scientists and researchers disagree on how to define it specifically and universally. if it is brought up in a linguistic study, linguistic. Every researcher uses this concept in accordance with his area of expertise because its definition varies depending on the dimensions from which each concept derives.

The environment will be defined legally in this situation. There are numerous legal definitions of the environment, and numerous international agreements and conferences have referred to these definitions.

In 1972, the Stockholm Environment Conference in Sweden defined the environment as "everything that surrounds man, whether natural or human."⁴ Also, the Tbilisi Conference in 1978 in Georgia defined it as a collection of natural, social, and cultural systems in which humans and other organisms live.⁵ In terms of the International Court of Justice, the environment has defined in its advisory opinion on the legality of the threat of using nuclear weapons that the

³ Hindawi, Nouredine, Melhem, & Essam Tawfiq Ahmed, *Environmental Criminal Protection* (Cairo: Dar Al-Nahda Al-Arabiya, 1992), without edition, p. 60.

⁴ Hussein Ali Al-Duraidi, *The Effectiveness of International Humanitarian Rules in Protecting the Environment during Armed Conflicts*, Ph.D. thesis, Amman University, Jordan, 2003, p. 11.

⁵ W. B. Stapp, D. Bennett, W. Bryan, J. Fulton, J. MacGregor, P. Nowak, & S. Havlick, "The Concept of Environmental Education," *Journal of Environmental Education*, UK, 1997, p. 36.

environment is not an abstract idea, but rather it represents living space and the quality of life, as well as the health of human beings themselves, including future generations.⁶ In terms of international humanitarian law, it adopted a narrow definition of the environment because it linked the environment to nature, and the term "natural environment" was used in Articles 35 and 55 of the First Additional Protocol in 1977. Regarding environmental protection, the⁷ Palestinian legislator defined the environment in Law No. (7) of 1999 as "the biosphere that includes living organisms and what they contain, air, water, and soil, as well as the facilities on them, and the interactions that exist between them."⁸

After studying various definitions of the environment, the researcher concludes that it is defined as everything that surrounds man, whether it is natural elements and their contents or elements developed by man and shaped to suit his needs in life.

Forms of Environment:

Many scholars have attempted to put different classifications for the types of the environment due to the comprehensiveness of the term environment, but in the context of the law and because international law jurists have dealt with the environment in its broadest sense, including the natural environment and the unnatural (constructed) environment. The researcher addresses these two types as follows:

Frist: Natural environment:

The natural environment is defined as everything that surrounds man from living and non-living phenomena, with no human intervention. Landscape, climate, natural plants, soil, and wild animals all represent environmental phenomena.⁹

There are two types of components of the natural environment:

Living components include:

- **Man:** It is one of the elements and components of the natural environment in it shares with the rest of living beings and is distinguished from it by a reason. Protecting man has been a focus

⁶ International Court of Justice, Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons, The Hague, 8 July 1996, <https://www.icj-cij.org/homepage/or/advisory.php>, date accessed: 17 May 2025

⁷ First Protocol to the Geneva Conventions, The Hague, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, Article 35, p. 176 · Article 55, p. 183

⁸ Palestinian Environment Law No. 7, 1999, *Palestinian Official Gazette*, No. 23, 15 December 1999, p. 4, Article 1.

⁹ Fathi Ismail Hawqa, *Environmental Pollution, Where to* (Cairo: Al-Asriyyah Library for Publishing and Distribution, 2010), 1st ed., p. 40.

of concern in international law, whether he is a civilian, fighter, prisoner, patient, doctor, person with disability, child or woman.... etc

- Plants: including trees, forests, agricultural crops, and herbs, are self-feeding organisms fixed in the soil. It has received protection under international humanitarian law in several instances.
- Animals: They are living organisms that are distinguished by their diversity and are also covered by the protection of international law.¹⁰

1) Non-Living components include:

- Water: It is the most vital environmental component on which the life of living organisms in general and humans in particular depends. One of the most crucial components of maintaining environmental balance is providing it with pure goodness, and there are numerous legal documents that guarantee the protection of water.
- Air: It is the basic condition for the life of living organisms, especially humans. A person can give up water for several days and food for several weeks, but he cannot dispense with air for more than a few minutes. There are many international agreements concerned with protecting the air and preventing the use of air-polluting weapons during armed conflicts.
- Soil: It is the source of nourishment for all living things. In armed conflicts, there are many ways that the soil can be attacked, including by planting mines across vast areas and using chemicals and pesticides to deplete the soil. However, numerous international legal provisions guarantee the protection of the soil.¹¹

Second: Unnatural (Constructed) Environment:

The term "constructed environment" or "unnatural environment" refers to all elements or information that have been added by man as a result of his interaction with and exploitation of the natural environment's resources. The built environment varies depending on both the level of human urbanization and the distribution and density of the population.¹² The civil facilities put in place by man to serve his civil needs are also referred to as the constructed environment. As result, a variety of components that are present in public, private, and protected areas make up the built environment.

¹⁰ Ibid.

¹¹ Ibid

¹² Zain al-Din Abd al-Maqsoud, *Environment and Man: A Study of Man's Problems with His Environment* (Alexandria: Manshaat al-Ma'arif, 1997), 2nd ed., p. 25.

The components of constructed environment or unnatural environment:

- 1) Public civil facilities: include buildings like schools, universities, dams, bridges, hospitals, irrigation networks, drinking water facilities, and other establishments that are owned by the state in which they are situated, provide public services to civilians during armed conflicts, and do not support military operations.¹³ It should be noted that if there are any questions about whether a facility is civilian or military, it must be treated as such and must be protected by international law. This protection is guaranteed by international law.
- 2) Private civil facilities: It refers to facilities owned by individuals or private communities that do not contribute to military operations and provide services only to specific people during armed conflicts. Individuals' homes and their annexes, industrial facilities owned by individuals or private institutions, and any other private real estate. etc.¹⁴

The obligation to protect private property was clear and explicit in Article 53 of the Fourth Geneva Convention, which prohibits the destruction of private property unless required by military necessity.¹⁵

- 3) Special protected areas: These are areas set up during armed conflicts to achieve specific humanitarian goals, and they include:
 - a. Hospital zones: hospital zones are defined in Article 23 of the 1949 First Geneva Convention and Article 14 of the 1949 Fourth Geneva Convention as zones established by the states parties to the conflict before or after the outbreak of the conflict to provide protection for the wounded and sick, as well as the personnel entrusted with organizing and managing these areas.¹⁶ Annex I to the First Geneva Convention was a draft agreement regarding hospitalization areas and sites, and it specified conditions that must be met in these areas in Article 4.¹⁷

¹³ Alexandre Kiss, *International Environmental Law* (Paris: [no publisher], 2000), 2nd ed., p. 131.

¹⁴ Ibid

¹⁵ Any destruction by the Occupying Power of real or personal property belonging individually or collectively to private persons, or to the State, or to other public authorities, or to social or cooperative organizations, is prohibited, except where such destruction is rendered absolutely necessary by military operations.

Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War, 12 August 1949, entered into force 21 October 1950, *United Nations Treaty Series*, vol. 75, p. 287, Article 53

¹⁶ Geneva Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, 12 August 1949, entered into force 21 October 1950, *United Nations Treaty Series*, vol. 75, p. 31, Article 23

¹⁷ Protocol Additional to the Geneva Conventions (I), Annex I, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 604, Article 4

Article 4 of Annex I to the First Geneva Convention stipulates that hospital zones meet the following conditions: 1- They occupy only a small part of the territory that is under the control of the State that establishes them- 2- Their population density is low in relation to the possibilities of residence in them, 3- They are far from Any military

- b. Neutral zones: Neutral zones are zones intended to protect wounded and sick combatants, non-combatants, and civilians who do not participate in conflicts, and parties to the conflict agree on them, and they are in the territories where fighting is taking place, and this is within a fixed-term written agreement.¹⁸
- c. Sites devoid of means of defense: Sites devoid of means of defense: According to Article 59 of the 1977 First Additional Protocol annex to the four Geneva Conventions, one of the parties to the conflict has the right to declare a site devoid of means of defense if a number of requirements are met on the site, which must be a populated area close to the armed forces' contact zone or within it.¹⁹
- d. Demilitarized zones: these are zones agreed upon by the parties to the conflict to be considered demilitarized, and the same conditions as previously referred to for zones devoid of defense are required, as stipulated in Article 60 of the First Protocol annexed to the Geneva Conventions.²⁰
- e. Prisoners camps: according to Article 23 of the Third Geneva Convention of 1949, prisoners must be gathered in locations that are safe from the conduct of combat operations and where they are provided with all of the services provided to civilians. These camps must be identified by the letters (PW) or (PG).

These are the unnatural environment elements surrounding combat zones, and it should be noted that everything related to civil life and created by man is considered one of the unnatural environment elements that must be protected during armed conflicts in accordance with international law.

Environmental Pollution:

Environmental pollution refers to the introduction of detrimental substances into the environment. These substances, known as pollutants, can take the form of chemical, physical, or biological agents. The presence of pollutants in the environment leads to adverse effects,

objectives or large industrial or administrative facilities devoid of any of them 4- They should not be located in areas where there is any possibility of them being important in the course of the war.

¹⁸ Geneva Convention (IV), Article 15, *ibid*, p. 293.

¹⁹ Protocol Additional to the Geneva Conventions (First Protocol), The Hague, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, art. 59(2), p. 623: "That the armed forces as well as mobile weapons and mobile military equipment be evacuated from him; 2- Not to use fixed military installations or institutions in hostile use; 3- Not to commit any hostile acts by the authorities or the population; 4- Not to conduct any activity in support of military operations

²⁰ Protocol Additional to the Geneva Conventions (First Protocol), The Hague, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, art. 66, p. 626

causing environmental degradation, and imbalance, and impacting the essential components of the ecosystem, both directly and indirectly.²¹ The modern concept of pollution includes everything that affects all vital elements, including plants, animals, and humans, as well as what affects the composition of non-living natural elements such as air, soil, lakes, and seas.

In general, it refers to anything that has an impact on all elements of the environment, including plants, animals, and humans, as well as anything that has an impact on the composition of non-living natural elements (air, seas, rivers, soil, and so on), implying that it is a corruption of the components of the environment caused by the presence of any material or energy that is not in its proper place, time, and quantity. Or it could be the presence of any internal substances that alter the physical, chemical, or biological characteristics of all or some environmental elements, turning them from helpful into harmful elements that lose their function in creating life and have harmful effects on both people and animals as well as the ecosystem.

There are many different levels of pollution danger to the environment, ranging from acceptable pollution to dangerous pollution to extremely dangerous pollution.²² Acceptable pollution is pollution that does not immediately threaten the manifestations of life, that does not exceed the limits set by international organizations and bodies on the surface of the earth, and that can be quickly contained by the environment due to its inherent technological capacity to absorb such pollution. In terms of dangerous pollution, it refers to the extent to which environmental pollutants exceed the safe line limit. This causes the ecosystem as a whole to be disrupted, and as a result, risks are created for both living and non-living environmental components. While extremely dangerous pollution means that environmental pollutants have reached dangerous levels that are destructive.²³

An overview of the Gaza Strip:

The Gaza Strip is a part of Palestinian territory goes over 365 square km along the Mediterranean Sea, situated on a relatively flat coastal plain, just northeast of the Sinai

²¹ Sercan Othman, "Determination of Social Studies Candidates' Understanding of Environmental Justice," *Uşak University Journal of Educational Research*, Bursa, vol. 13, no. 2, 2022, pp. 57–73

²² Ali Adnan Al-Fail, *Explanation of Environmental Pollution in Arab Environmental Protection Laws* (Bursa: National Center for Legal Publications, 2013), p. 40.

²³ *ibid*

Peninsula. The Gaza Strip is unusual in being a densely settled area sieged de facto. Gaza strip has the highest population in the world, it is about 2.2 million.²⁴

Living conditions in the Gaza Strip are typically poor for a number of reasons: about 70% of population are refugees, the blockade and repeated wars against Gaza affect the life quality, the region's dense and rapidly increasing population (the area's growth rate is one of the highest in the world); inadequate water, sewage, and electrical services; and high rates of unemployment.²⁵ Political tension and outbreaks of violence often lead Israeli authorities to close the border for extended periods.²⁶

The strip lives under an illegal and strict land, air, and sea blockade, entering its seventeenth year in June 2023. This blockade is considered a collective punishment for civilian populations, affecting all aspects of life in Gaza and threatening most human rights. This represents a clear violation of Israel's legal obligations under international humanitarian law. In accordance with the provisions of international humanitarian law, the Gaza Strip is considered an occupied territory, and the provisions of this law apply to it. Israel as an occupying entity still maintains control over most elements of sovereignty in the Strip, such as water, main roads, security, and freedom of movement. It also exercises control over crossings, borders and external relations.

It is worth noting that the repeated wars launched by Israel against civilians and civilian infrastructure in Gaza show that the Strip is subject to Israeli occupation strategies. As a result, the sector must be governed by the rules of belligerent occupation included in international law.

²⁴ "Gaza Strip", Encyclopedia Britannica, London, 2023, <https://www.britannica.com/place/Gaza-Strip> ,accessed May 17, 2025.

²⁵ "Gaza Strip", United Nations Relief and Works Agency (UNRWA), Gaza, no date, <https://www.unrwa.org> , accessed May 17, 2025

²⁶ Ibid.

1. The Reality of Environmental Violations in The Gaza Strip

Israel's occupation has rendered the Gaza Strip highly susceptible to a range of natural and environmental risks. The repeated acts of aggression against the region have significantly impacted all aspects of life and the environment in Gaza. The accumulation of debris from demolitions has led to environmental pollution, particularly affecting agriculture. Moreover, the continuous raids on land and its productivity have caused natural, chemical, and biological changes in the soil, impacting groundwater quality. Additionally, power outages have contributed to seawater pollution. Studies have indicated a decline in air quality in areas where debris handling and crushing facilities are located, exceeding acceptable levels of small particle concentrations according to the World Health Organization.²⁷

The occupation has implemented policies in Gaza that have adverse environmental effects, including recurrent violations at sea, the appropriation of water resources, and the discharge of sewage onto agricultural lands along the eastern border. Since late 2008, Palestinians have been hindered from accessing their lands, situated approximately 1,500 meters away from the Green Line. Coastal areas within a 3-mile radius are also inaccessible to Palestinians. Consequently, Palestinians are deprived of 17% of Gaza's total land area and 35% of its agricultural lands. Comparison to the 2014 aggression, areas that have been targeted by the occupation have experienced a notable escalation in disease prevalence among the population. Notably, there has been a 72% surge in cancer cases, a 68% rise in skin diseases, and a 44% increase in respiratory ailments.²⁹ The occupation's imposed restrictions have created obstacles to the entry of essential materials and tools into the Gaza Strip, leading to the discharge of approximately 110,000 liters of untreated and treated sewage water into the sea daily. The Israeli aggression in 2014 resulted in extensive damage to approximately 70% of water facilities in Gaza, with 36 healthcare facilities, including treatment plants, water wells, and sewage networks, being targeted. Over the past decade, there has been a decline in the agricultural land area in the Gaza Strip. Initially spanning 192,000 dunums, the agricultural lands have now been

²⁷ Ahmed Salih Safi, *The War on Gaza 2014, Assessment of the Environmental Impact of the War on Gaza Using a Participatory Methodology* (NGO Network, 2015), p. 8.

²⁸ "Between the Wall and the Anvil: The Humanitarian Impact of Israeli Restrictions on Access to Land and Sea in the Gaza Strip," *United Nations Office for the Coordination of Humanitarian Affairs in the Occupied Palestinian Territory*, August 2010, <https://www.ochaopt.org/ar/content/2010-7>, accessed May 18, 2025.

²⁹ *ibid*

reduced to around 100,000 dunums due to factors such as rapid population growth, urban expansion, and occupation measures in the buffer zone. The Palestinians have been particularly affected by the occupation's actions in the buffer zone, as they have been deprived of approximately 17,000 dunums, which accounts for 15% of the agricultural lands. These areas are highly fertile and suitable for cultivation, making their loss a significant setback for the Palestinian agricultural sector.³⁰ Furthermore, the Gaza Strip has endured devastating wars in 2008, 2012, 2014, 2021, and 2023, resulting in extensive destruction of homes and leaving behind substantial amounts of rubble. The use of various types of bombs and weapons, including those containing toxic gases, has had a detrimental impact on the environment, contributing to increased air pollution.

Experts emphasize that the recent aggression against the Strip has exceeded expectations in terms of environmental pollution. This is evident in the accumulation of solid and hazardous waste, as well as the pollution of beaches, land, and air.

1.1 Internationally Prohibited Weapons Used Against The Gaza Strip

Since the imposition of the blockade in 2006, Israel has implemented a series of policies toward the Gaza Strip that have had profound environmental and humanitarian implications. Moreover, Israel has conducted several military operations in Gaza, leading to widespread destruction of infrastructure, including homes, schools, and hospitals. These military offensives have had devastating consequences for the civilian population, causing loss of life and exacerbating already dire living conditions. However, the Israeli military operations and their utilization of internationally prohibited weapons have had a profound impact on the environment within the Gaza Strip. The series of assaults conducted by the Israeli occupation forces on the Gaza Strip in recent years stand out as some of the most devastating military actions that have left lasting detrimental effects on the environment. This is largely attributed to Israel's use of highly destructive and internationally banned weaponry, marking a grave violation of international norms and conventions governing armed conflict. The utilization of such weaponry has raised significant concerns about the long-term ecological and human consequences, underscoring the urgency for addressing the legality and consequences of these actions.

³⁰ "Urban Agriculture in the Gaza Strip," *Gaza Urban and Peri-Urban Agriculture Platform*, Gaza, n.d., <https://gupap.org/>, accessed May 18, 2025.

1.1.1 White Phosphorus:

White phosphorus is a chemical substance that appears as a waxy, transparent white substance with a slight yellowish tint. It is manufactured from phosphates and reacts rapidly with oxygen, producing intense flames and dense white smoke. This highly incendiary substance ignites upon contact with air and its effects can spread over a wide area. Military personnel primarily use white phosphorus munitions as a camouflage agent to ground movements during combat operations.³¹ White phosphorus inflicts deep, painful, and slow-healing burns when in contact with human skin. Moreover, dousing white phosphorus fires with water intensifies their burning, making it exceptionally dangerous in civilian-populated areas. While these weapons are legally permissible under international law when used for their intended purpose (camouflage), deploying them in densely populated areas or urban environments constitutes a war crime, as stipulated by Article 2 of the Third Protocol to the Convention on Certain Conventional Weapons of 1980.

Israel's use of white phosphorus in its attacks on the Gaza Strip has been documented. In a report by Haaretz on January 21, 2009, the Israeli military acknowledged using white phosphorus in an airstrike on a UNRWA school in Jabalia on January 6, 2009.³² Additionally, the Israeli army confirmed on January 20, 2009, to CounterPunch magazine that it had fired nearly 200 white phosphorus artillery shells during the conflict. Human Rights Watch also documented the use of white phosphorus in northern Gaza, while The New York Times shared evidence, including photos of empty white phosphorus shell casings, used during the assault on Gaza. But later, the Israeli military refrained from officially admitting the use of this weapon, likely due to concerns about international condemnation, as witnessed in the Goldstone Report.³³

³¹ Ahmed Mahmoud Hammadi, *Environmental Pollution in Lebanon Due to the July 2006 Aggression and Israel's Responsibility in Light of International Humanitarian Law*, Master's thesis, Islamic University, Lebanon, 2010, 70

³² Michele K. Esposito, "The Israeli Arsenal Used Against Gaza During Operation Cast Lead." *Journal of Palestine Studies*, vol. 38, no. 3, 2009, pp. 175–191

³³ "The Use of Internationally Banned Weapons During the War on Gaza." *Al Jazeera Channel in YouTube*, Al-doha, <https://www.youtube.com/watch?v=YpsW8XZUNsw>, accessed May 18, 2025

1.1.2 Dime Bombs:

Israel has used the DIME (Dense Inert Metal Explosive) weapon in multiple aggressions against Gaza. DIME bombs are a relatively new type of munition developed in U.S. weapon laboratories.³⁴ They are designed for use in urban areas, with the capability to limit their destructive effects to a specific geographic area. These munitions consist of a homogeneous mixture of explosives along with chemically inert tungsten metal. Upon detonation, the tungsten rapidly disintegrates into minuscule particles, resulting in immediate fatalities within a 4-meter radius and causing severe injuries to those at a greater distance. The injuries may include amputations and an increased risk of developing cancer in affected tissues.³⁵

1.1.3 Electromagnetic Weapons:

Electromagnetic weapons, also known as microwave weapons or direct energy weapons (DEWs), have been documented to cause deformities and injuries in Gaza hospitals. Medical reports indicate that the effects of this weapon manifest as highly abnormal disfigurements, severe burning, and the melting of skin, even penetrating bones. This type of weapon is known to sever the limbs of the targeted individuals and cause burns across various parts of their bodies.³⁶

1.1.4 Thermobaric Bombs and Vacuum Pressure Bombs:

These bombs, particularly when used in populated areas, can cause severe harm to both infrastructure and human lives, leading to long-term health consequences for those affected.

Thermobaric Bombs: These are a type of explosive weapon that uses oxygen from the surrounding air to generate an intense, high-temperature explosion. They create a shockwave that can cause significant damage to structures and people within the blast radius. Thermobaric bombs are known for their destructive power.

Vacuum Pressure Bombs: Vacuum bombs, also known as fuel-air explosive (FAE) bombs, work by first spraying a fine mist of flammable fuel and then igniting it. The resulting explosion creates a shockwave and a vacuum that can cause extensive damage. These bombs

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

are sometimes referred to as "thermobaric" as well, as they use similar principles to thermobaric explosives.

Bombs Containing Uranium: Some bombs contain depleted uranium, a heavy and dense metal. Depleted uranium is used to enhance the penetration capabilities of munitions, making them more effective against armored targets. However, the use of such bombs can result in the dispersal of radioactive dust, posing health risks to those exposed.³⁷

This has led to the cracking of the very ground above these tunnels. There is medical evidence confirming Israel's use of this type of weaponry, manifested in an increased incidence of lung collapses, unexplained cardiac arrests, and cerebral bleeding among the population.

1.2 Israeli Violations of The Environment in The Gaza Strip and Its Effects:

The environment Gaza Strip has been subjected to numerous violations by Israel, particularly during the years of the blockade. The frequent aggressions on the strip resulted in widespread destruction across various environmental aspects. The following is an illustration of the most prominent of these violations' effects:

1.2.1 Water Pollution:

The control over water resources by the Israeli occupation severely impacts the Gaza Strip. Palestinians in Gaza are allocated a meager 18% of the water from the coastal aquifer, which amounts to around 90 liters per day, well below the global average of 150 liters per day. In contrast, Israelis enjoy 82% of the water share, highlighting a significant disparity. Furthermore, Israel exploits 90% of the available renewable water in Palestine, leaving a mere 10% for the Palestinians, the occupation further exacerbates the situation by deliberately targeting and destroying crucial water installations and projects in the Gaza Strip. Additionally, it imposes restrictions on the entry of over 23 essential materials necessary for water, sanitation, and hygiene, including pumps, drilling equipment, and chemical sterilization materials. These items are classified as "dual-use" and are prohibited from entering the Strip.³⁸ The occupation authorities also repeatedly cut off water supplies to the Gaza Strip, whether by destroying

³⁷ Maat Center for Legal and Constitutional Studies, "Israeli War Crimes in Gaza: Towards a Mechanism for Documentation and Prosecution," *Maat Center for Legal and Constitutional Studies*, Cairo, n.d., <http://www.wata.cc/forums/archive/index.php/t-42097.html>, accessed May 18, 2025

³⁸ Amnesty International, "The Occupation of Water," *Amnesty International*, London, November 29, 2017, <https://www.amnesty.org/en/latest/campaigns/2017/11/the-occupation-of-water/>, accessed May 18, 2025

infrastructure or cutting pipelines that supply the Strip with water, as well as destroying water desalination plants. Moreover, the materials resulting from explosions and raids lead to an increase in the level of pollution in the water.

The Gaza Strip is in a critical situation in terms of water availability, annually the Strip requires over 210 million cubic liters of fresh water to meet domestic, agricultural, and industrial needs. Approximately 96.1% of Gaza's water supply is classified as polluted and unfit for human consumption. Moreover, numerous reports have revealed a significant and widespread decline in the aquifer's water level. The aquifer provides approximately 94% of the total water requirements of the majority of the Strip's population. The aquifer's water level decline poses a significant challenge to the people of Gaza, affecting their access to a reliable and sustainable water supply.³⁹ The coastal groundwater in Gaza serves as the sole source of fresh water for the strip. However, it is unable to meet the growing demands of the population, primarily due to a decrease in rainfall, which is crucial for replenishing the aquifer. Currently, the annual rainfall in Gaza averages around 320 mm, equivalent to approximately 116 to 120 million cubic liters of water. Unfortunately, only a quarter of this rainfall is able to recharge the aquifer. The situation is further aggravated by unregulated groundwater extraction, particularly from unauthorized wells. As a result, the annual consumption of groundwater in Gaza reaches 200 million cubic liters, with half of it allocated for agricultural purposes and the other half for various other uses. This significant disparity between water supply and demand poses a significant challenge to the people of Gaza, leading to water scarcity and the need for sustainable water management strategies. there are three main desalination plants in the strip, situated in the northern and central regions. These facilities are of paramount importance as they employ the process of desalination to convert seawater into freshwater, serving as a vital source of potable water for all areas within the Strip. Desalination of seawater is viewed as a strategic measure implemented by the Palestinian Water Authority to tackle the challenges of water scarcity and compensate for the shortfall in groundwater resources. This approach aims to guarantee access to safe drinking water for the two million Palestinian inhabitants residing in the Gaza Strip.⁴⁰

According to the World Health Organization, the groundwater in the Gaza Strip fails to

³⁹ Amnesty International, "The Occupation of Water," *Amnesty International*, London, November 29, 2017, <https://www.amnesty.org>, accessed May 18, 2025.

⁴⁰ Ministry of Planning, *Sectoral Plan: Water and Sanitation Sector* (Gaza: Ministry of Planning, 2020), p. 8.

meet international standards. The chloride concentration in 224 out of 282 wells is reported to be 79%, with levels reaching 250 mg per liter of water, surpassing the recommended limit. Furthermore, approximately 88% of the wells in the region have nitrate levels exceeding the permissible limit of 50 mg, the reason for the appearance of these levels of pollution in the groundwater is due to the toxic substances resulting from the practices of the Israeli occupation.⁴¹

The control over water resources by the Israeli occupation severely impacts the Gaza Strip. Palestinians in Gaza are allocated a meager 18% of the water from the coastal aquifer, which amounts to around 90 liters per day, well below the global average of 150 liters per day. In contrast, Israelis enjoy 82% of the water share, highlighting a significant disparity. Furthermore, Israel exploits 90% of the available renewable water in Palestine, leaving a mere 10% for the Palestinians, the occupation further exacerbates the situation by deliberately targeting and destroying crucial water installations and projects in the Gaza Strip. Additionally, it imposes restrictions on the entry of over 23 essential materials necessary for water, sanitation, and hygiene, including pumps, drilling equipment, and chemical sterilization materials. These items are classified as "dual-use" and are prohibited from entering the Strip.

1.2.2 Pollution of Sea and Beach Water and Sanitation Problems:

The Gaza Strip experiences a multitude of environmental transgressions, culminating in the contamination of its coastal waters and beaches, as well as exacerbating sewage management challenges. These deleterious conditions arise from the policies enacted by Israel vis-à-vis the Gaza Strip. Repeated aerial assaults result in the release of chemical agents and contaminants into the marine ecosystem. Furthermore, the occupying authorities deliberately curtail the supply of fuel and electricity, thereby impeding the optimal functioning of sewage treatment facilities or, in some instances, destroying the treatment facilities completely. Consequently, untreated sewage infiltrates the coastal waters. Additionally, the prohibition on fishing imposed by Israeli authorities upon the denizens of the Gaza Strip engenders environmental disparities and augments the pollution of marine waters. The marine environment in the Gaza Strip is plagued by an alarming pollution rate of 60%, the primary cause of this pollution is the uncontrolled discharge of untreated sewage, with a staggering volume of up to 90 million liters

⁴¹Interview with Karm Al-Aour, environmental expert at the Palestinian Water Authority, Gaza, April 24, 2023.

of "partially" treated sewage being released into the sea on a daily basis. This distressing reality poses a severe threat to marine life and coastal areas, rendering them unsuitable for swimming due to persistent pollution.⁴² In recent years, the pollution rate in the Gaza Strip has seen a notable increase from its 2013 level of 20%, largely attributed to escalated Israeli restrictions and daily violations. These restrictions have resulted in prolonged power cuts, which severely hinder the operation of sewage treatment facilities. Additionally, the destructive impact of wars has damaged sewage treatment pumps, exacerbating the pollution crisis.⁴³

Despite the presence of seven central sewage treatment plants and several non-centralized facilities in the Gaza Strip, approximately 110,000 cubic liters of sewage still find their way onto the beaches, contaminating the region's only water source and the surrounding soil. The treatment of wastewater poses significant challenges in the Gaza Strip, mainly due to recurrent electricity crises that disrupt the pumping of sewage water to treatment plants. Consequently, untreated wastewater is redirected toward the sea, further contributing to the pollution of the marine environment.⁴⁴ During the period of aggression, the Gaza Strip experienced extensive destruction of its sewage infrastructure. Six out of the 18 sewage pumps were completely destroyed, and four stations were rendered inoperable. Additionally, numerous sewage networks suffered damage. As a result, the dire circumstances compelled the daily discharge of over 13,000 cubic liters of untreated wastewater into the sea.

Waterborne diseases in the Gaza Strip account for more than a quarter of all registered illnesses, posing a significant health concern in the strip. These diseases are particularly prevalent among children and contribute significantly to childhood morbidity rates.⁴⁵ Furthermore, the pollution of seawater poses a significant threat of contaminated water infiltrating the aquifer, further endangering the already limited freshwater resources in the area.

⁴² United Nations Office for the Coordination of Humanitarian Affairs, "Gaza: Lack of Sewage Infrastructure Increases Health and Environmental Concerns, *United Nations*, New York" June 4, 2021, www.ochaopt.org, accessed May 18, 2025

⁴³ Ibid, the interview with Karam Al-our, footnote 41.

⁴⁴ Interview with Muhammad Musleh, Director of the Solid Waste and Sanitation Department, Water and Environmental Quality Authority, Gaza, March 3, 2023.

⁴⁵ WHO, "Right to Health 2018", *World Health Organization*, Geneva, 2018, <https://www.emro.who.int>, accessed May 18, 2025

1.2.3 Solid Waste:

Solid waste management in the Gaza Strip confronts escalating challenges attributed to Israeli policies within the region. The occupying authorities engage in the aerial bombardment of waste disposal sites, rendering their proper disposal arduous. This onslaught culminates in the accrual of both conflict-generated debris and structural remnants. Moreover, the imposition of a blockade exerts a profound influence on the efficient management of solid waste, constraints on the importation of essential materials and equipment requisite for waste management further precipitate the mounting accumulation of refuse, whilst concurrently engendering a dearth of adequate resources for its judicious and sustainable handling. Additionally, periods of heightened aggression frequently disrupt the routine household solid waste collection service, leading to the amassing of substantial volumes of domestic waste along the thoroughfares of Gaza, particularly within areas subjected to invasion or severe aerial bombardment.⁴⁶ Following the 2021 aggression, the streets of the Gaza Strip were overwhelmed with approximately 11,040 tons of accumulated household waste. The total amount of waste collected in the Gaza Strip is more than 1950 tons per day, with a per capita production rate of 0.9 kg/day. Each ton of solid waste produces approximately 250 liters of toxic juice after its complete decomposition. Additionally, residents have witnessed the accumulation of hazardous waste, particularly the remnants of agricultural pesticides resulting from bombings. The burning of pesticides alone amounted to 259 tons, and hospitals accumulated around 13 tons of hazardous medical waste.⁴⁷ These factors contribute to environmental degradation in the Strip and have a negative impact on all aspects of life.

It is crucial to address the challenges faced in solid waste management in the Gaza Strip, as they have far-reaching implications for public health, the environment, and the overall well-being of the population. Efforts are needed to overcome the obstacles posed by the blockade and ensure sustainable waste management practices, with support and collaboration from the international community.

⁴⁶ "In a seminar organized by *Horizons for Environment and Development*: Environmental and health effects of aggression require experts to be brought to Gaza," *Horizons for Environment and Development*, Gaza, November 6, 2023, <https://www.maan-ctr.org/magazine/article/3086/>, accessed May 18, 2025.

⁴⁷ Ramy Salem, "Solid Waste in the Gaza Strip," *EcoMENA*, April 23, 2024, <https://www.ecomena.org/gaza-waste/>, accessed May 18, 2025.

1.2.4 Soil Pollution and Damage to Agricultural Lands

The Israeli aggression on Gaza has significantly contributed to the severe soil pollution and damage in the region, particularly in its agricultural lands. The Gaza Strip encompasses approximately 170,000 dunums of agricultural land, which is deliberately targeted by missile strikes from the Israeli occupation. These relentless attacks result in the destruction of agricultural lands, crops, and infrastructure. Furthermore, even the border agricultural lands, which make up just one percent of the total agricultural lands, are subjected to attacks in the form of gas bombs, pesticide spraying, and the use of toxic and harmful materials.⁴⁸ The spraying of these lands with toxic pesticides not only causes significant damage to large fields and crops but also poses health risks to the population, leading to the spread of diseases and epidemics.⁴⁹

The impact of shelling and missile strikes by the occupation has resulted in the damage of over 35,000 dunums of agricultural land. Additionally, it is estimated that the temperature of the soil, due to the intensity of the bombings, has increased by more than 2000 degrees Celsius.⁵⁰ This extreme heat not only kills organisms in the soil but also destroys organic matter, further exacerbating the damage to agricultural lands and disrupting the ecological balance. The ongoing soil pollution in Gaza poses significant challenges to the agricultural sector and the overall environment. It hampers agricultural productivity, affects food security, and increases the risk of contamination, leading to health hazards for the population. Efforts are needed to mitigate the sources of soil pollution, restore damaged agricultural lands, and promote sustainable agricultural practices to protect the soil and ensure a healthier environment for the people of Gaza.

⁴⁸ "Experts warn that Gaza's agricultural soil contains carcinogens," *Palestine Newspaper*, Gaza, May 6, 2021, <https://felesteen.news/post/89272/>, accessed May 18, 2025.

⁴⁹ "Flooding eastern Gaza with water and pesticides... Israel's new weapon against the Palestinians and their crops," *Horizons for Environment and Development Magazine*, Gaza, January 2020, <https://www.maan-ctr.org/magazine/article/2495/>, accessed May 18, 2025.

⁵⁰ Ibid

1.2.5 Air Pollution:

Israeli violations have had a devastating impact on air pollution in the Gaza Strip, causing significant harm to the environment and the health of its residents. The repeated Israeli aggression and military operations have resulted in the widespread destruction of infrastructure, including residential buildings, factories, and power plants. These attacks release massive amounts of smoke, dust, and hazardous pollutants into the air, leading to a sharp increase in air pollution levels. For instance, during the 2021 aggression, approximately 275,000 tons of rubble were left behind, contributing to the deterioration of air quality.⁵¹ Furthermore, the use of internationally prohibited weapons, such as white phosphorus and depleted uranium, by the occupying forces has resulted in the release of toxic gases and harmful substances into the atmosphere, further exacerbating air pollution. These violations have long-term consequences, as the pollutants emitted during the conflicts can persist in the environment, posing ongoing health risks to the population. The high levels of air pollution in the Gaza Strip not only affect the respiratory health of the residents but also have wider ecological implications, impacting plant and animal life and contributing to the overall degradation of the environment.⁵² The Israeli violations continue to perpetuate a cycle of environmental destruction and health hazards, underscoring the urgent need for sustainable solutions and international intervention to address the air pollution crisis in Gaza.

1.3 The Effects of the Blockade on the Environment in The Gaza Strip:

After the legislative elections in January 2006, Israel began enforcing a blockade on the Gaza Strip. In June 2007, it tightened the blockade by designating the Gaza Strip as a "hostile entity" and enacting new sanctions that affected the people's basic rights.⁵³ This blockade has effectively isolated approximately 2.2 million Palestinians residing in the Gaza Strip, confining them to a limited geographic area of 365 square kilometers. The Strip has essentially become an open-air prison, besieged from all sides—land, air, and sea. whereas the Israeli authorities exercise complete control over the borders and crossings, severely restricting the freedom of

⁵¹ Ibid

⁵² "Among the most heinous war crimes against our people and their environment in Gaza: Israel's use of weapons containing depleted uranium," *Horizons for Environment and Development Magazine*, www.maan-ctr.org, accessed 18 May 2025

⁵³ "Suffocation and Isolation of 17 Years of Siege on the Gaza Strip", *Euro-Mediterranean for Human Rights*, 1 October 2023 · <https://euromedmonitor.org/ar/>, accessed 18 May 2025

movement for the Strip's residents. Consequently, the population density in the Gaza Strip has reached alarming levels, estimated at an approximate average of 5,453 individuals per square kilometer.⁵⁴ The ensuing high population density increases the strain on the already scarce environmental resources, making the imposition of this blockade a form of collective punishment. This situation results in higher consumption rates and more strain on the wastewater and solid waste disposal systems. Disruptions to the operation of desalination plants and solid waste disposal facilities are among the difficulties faced, which exacerbate the environmental problems in the Gaza Strip. Stretching already limited resources further exacerbates the environmental impact and makes it harder for the local population to manage waste and get access to clean water. The blockade is a significant obstacle to efforts to rebuild in Gaza after a string of military assaults. As the Gaza Strip witnessed fifteen military assaults that involved warplanes and powerful weapons, with three of them taking place just in 2023. One of these attacks completely destroyed important infrastructure, which had a negative effect on the environment. Environmental problems in the Gaza Strip are made even worse by the inability to repair and rebuild the damaged infrastructure and by environmental preservation, the blockade and the damage brought on by military assaults continue to obstruct recovery and have a negative impact on the region's environmental situation.

1.3.1 The Impact of The Blockade on Access to Basic Facilities:

The blockade imposed on the Strip affects the residents' access to basic facilities, as the Strip suffers from a difficult humanitarian situation due to the blockade imposed by Israel on the Strip, which led to a deep human dignity crisis that resulted in an erosion of livelihoods and a significant deterioration in basic services.

As the blockade affects people's access to electricity, the only power plant in Gaza operates intermittently, leading to a 41% electricity shortage in the Gaza Strip, which keeps the population without electricity for up to 16 hours every day. These outages leave the power plant vulnerable to long-term damage and not receiving proper maintenance. Energy shortages also affect the water and sanitation systems, with obvious health and environmental consequences. The electricity demand in the Gaza Strip is estimated at an average of 237 megawatts. 51% of

⁵⁴ "According to statistics conducted by the Palestinian Central Bureau of Statistics in 2019," *Palestinian Central Bureau of Statistics*, <https://www.pcbs.gov.ps>, accessed 18 May 2025

it (122 megawatts) was purchased from Israel and another 7% (17 megawatts) from Egypt. While Gaza's only power plant can currently produce, at full capacity, approximately 34% of the demand, leaving an electricity deficit of 8%.⁵⁵

The power outage has had a disruptive effect on the water and sewage infrastructure in Gaza. Around 80% of the water wells in Gaza are only partially operational or not functioning at all. Consequently, over half of the residents in the Gaza Strip have limited access to water, typically for just a few hours per week.

Since the imposition of the blockade in June 2007, there has been minimal development or expansion of new water and sanitation infrastructure. Additionally, the maintenance required to upkeep the existing infrastructure is hindered by a shortage of pipes, spare parts, and building materials. This systemic deterioration poses a significant public health and environmental risk, increasing the likelihood of diseases and hindering overall social and economic development in the long term. While the fuel shortage is directly linked to the blockade, the situation worsened in late August 2008 due to conflicts between the Palestinian Water Authority in Ramallah and Hamas in Gaza. Consequently, the funding allocated by the Palestinian Water Authority for purchasing fuel for water and sanitation facilities in Gaza has been suspended which made the situation worse.⁵⁶

As a result of the blockade, there is a scarcity of materials, such as chlorine, used for water disinfection. This has led to an increase in waterborne diseases, as approximately 80% of the water supplied in Gaza fails to meet the standards set by the World Health Organization. Moreover, the untreated discharge of approximately 70 million liters of sewage into the sea on a daily basis has caused significant environmental damage. This unstable condition of the sewage system heightens the risk of flooding during the winter season and poses additional environmental risks.⁵⁷

⁵⁵ OCHA report, "GAZA HUMANITARIAN SITUATION REPORT THE IMPACT OF THE BLOCKADE ON THE GAZA STRIP A HUMAN DIGNITY CRISIS", *Office for the Coordination of Humanitarian Affairs*, New Yurok, 15 December 2008, <https://www.un.org/unispal/document/auto-insert-209698/>, Accessed 18 May 2025.

⁵⁶ Interview with Mr. Iyad Allami, Palestinian Center for Human Rights, 25 June 2023.

⁵⁷OCHA, "Humanitarian Situation Report in the Gaza Strip: Impact of Fuel Shortage on Gaza Sanitation – Pollution of the Sea," *Office for the Coordination of Humanitarian Affairs*, 29 April 2008, <https://www.un.org/>, Accessed 18 May 2023.

Moreover, the Gaza Strip faces a shortage of healthcare services, with hospitals and clinics operating but providing poor-quality services, and limited access to these services. During power outages and due to water pollution, hospitals and healthcare facilities in Gaza heavily depend on backup generators to maintain the provision of medical services. The blockade and inadequate investment in development have resulted in damage to medical equipment, rendering the healthcare services unable to effectively meet the health requirements of the population.⁵⁸ The situation was exacerbated by the lack of maintenance and the lack of spare parts resulting from the blockade. As is the case in other sectors, the lack of building materials and inputs prevents the repair or expansion of health facilities and infrastructure. Another consequence of the blockade is the inability of medical staff to update their knowledge and skills and to participate in vocational training due to the travel ban, as a result, many patients are referred for specialized care in hospitals in Israel, Jordan and Egypt.

Since the closure of the Rafah crossing in June 2007, there has been a significant rise in the number of patients departing Gaza through the Erez crossing. However, a considerable percentage of patients faced challenges in crossing due to rejection or disability imposed by Israeli authorities. The percentage of patients unable to cross increased from 9.8% in 2006 to 22.5% in the first nine months of 2008. This means that approximately 2,691 patients, suffering from conditions such as cancer, heart disease, and other complex medical conditions, were unable to access the necessary treatment due to the blockade and restrictions imposed by Israeli authorities on the Strip.⁵⁹ Additionally, the scarcity of medications and ineffective equipment, as well as the shortage of specialized medical staff and limitations on medical referrals outside Gaza, further compounded the challenges faced by these patients.

Therefore, it is evident that the blockade has a direct impact on constructed environmental elements such as water and electricity generation stations, hospitals, and healthcare facilities, thereby hindering the population's access to basic services.

1.3.2 The Impact of The Blockade on The Population:

The blockade imposed on Gaza has had catastrophic consequences for the lives of its residents. The unemployment rate has risen dramatically, escalating from 32.3% in the second

⁵⁸ Ibid

⁵⁹ Interview with Samir Al-Mana'meh, lawyer at Al-Mezan Center for Human Rights, 25 July 2023.

quarter of 2007 to a staggering 49.1% during the corresponding period in 2008. This trend of increasing unemployment persisted, reaching one of the highest rates globally. In the first quarter of 2022, the youth unemployment rate, specifically for individuals aged 15 to 29, was even more alarming, standing at approximately 62.5% during the same period.⁶⁰ The percentage rises to close to 80% among graduates in 2023.⁶¹ These figures paint a grim picture of the severe economic hardships endured by the people of Gaza as a result of the blockade.

The dire economic crisis and soaring unemployment rates have plunged numerous families in the Gaza Strip below the poverty line. The estimated poverty rate in the Strip stands at around 64%, with 33.8% of Gazans living in extreme poverty.⁶²

Consequently, families in Gaza face significant challenges in securing an adequate food supply, as nearly six out of ten families in the region experience food insecurity. As a result, families in Gaza are enduring food insecurity, with nearly six out of ten families in the region affected. The lack of income and high prices have significantly impacted food security and nutritional levels among the population. Around 1.3 million out of the total 2.1 million Palestinians in Gaza (62%) are in need of food assistance.⁶³

The safety of food in the Gaza Strip is increasingly compromised. This issue has been exacerbated by the damage inflicted upon agricultural lands due to chemical spraying by Israeli forces. Moreover, the scarcity of electricity has led to a decrease in irrigation water, further exacerbating the challenges faced by farmers which results in a lack of vegan food sources.

The overall situation has also resulted in increased operational costs for food storage. Additionally, there has been a decline in the quantity and quality of food available, which has compelled the population to shift towards more affordable food options such as grains, sugar, and oil, providing high energy but lacking in essential nutrients. This shift in dietary patterns has led to a rise in shortages of basic food items, particularly impacting vulnerable groups such as children and pregnant women. Notably, there has been a notable increase in the prevalence

⁶⁰The ILO definition of unemployment includes individuals (15 years and over) who are not working and who are actively looking for work opportunities. The expanded definition of the Palestinian Central Bureau of Statistics adds to this definition people who are willing to work but are not looking for work (known as frustrated).

⁶¹"Labor Force Survey", *Palestinian Central Bureau of Statistics*, Ramallah, 2022 <https://www.pcbs.gov.ps>, Accessed 18 May 2025

⁶² Ibid

⁶³"Years of Siege on the Gaza Strip: Numbers and Indicators", *Council on Palestinian International Relations*, Ramallah, 2022, <https://coir.ps/>, Accessed 18 May 2023.

⁶⁴ "Let the 16-Year-Old Siege Crime Stop", *Al-Mezan Center for Human Rights*, Gaza, 2023, <https://www.mezan.org>, Accessed 18 May 2023.

of anemia among children, with an estimated rate of 47% due to the high levels of food insecurity in the Gaza Strip.⁶⁴

The blockade has significant and wide-ranging consequences on the environment, both directly and indirectly, primarily due to its impact on the well-being of the people living in the area. The direct effects are seen through the destruction and damage caused to the environment as a result of the blockade and the Israeli attacks on the Strip.

Additionally, the indirect effects stem from the population's focus on addressing the crises of human dignity that arise from the blockade. The limited resources and the struggle for survival often divert attention and resources away from addressing environmental concerns. This can hinder efforts to mitigate and address the environmental damage caused by the blockade and subsequent attacks.

It is crucial to recognize the interconnection between human well-being, the environment, and the impact of the blockade. Finding sustainable solutions that address both the human and environmental aspects is essential for the long-term recovery and well-being of the Gaza Strip.

1.3.3 The Impact of The Blockade on The Recovery of The Environmental Situation in The Strip:

The blockade imposed on the Gaza Strip has had a significant impact on the recovery of the environmental situation in the region. The restrictions on the entry of essential goods, including equipment and materials needed for environmental conservation and restoration, have hindered the progress of environmental recovery efforts.

The blockade has hindered many reconstruction projects, due to the restrictions imposed on the entry of materials needed for reconstruction through the crossings, under the pretext of the dual use of these materials, as about 13 reconstruction projects have been halted since May 2021 due to the blockade imposed on the Strip.⁶⁵

The lack of access to proper resources and technology has limited the ability to address environmental challenges effectively. For example, the scarcity of construction materials

⁶⁴ Press Release on the Occasion of the Palestinian Child Day", *Palestinian Central Bureau of Statistics*, Ramallah, 2023, <https://www.pcbs.gov.ps/>, Accessed 18 May 2023.

⁶⁵ "Gaza Municipality Warns of Continued Suspension of Infrastructure Projects", *Gaza Municipality*, Gaza, 2023, <https://palpress.net>, Accessed 18 May 2023.

impedes the reconstruction of infrastructure damaged by conflicts, including water and sanitation systems, which contributes to environmental degradation. Additionally, the blockade restricts the import of necessary equipment and materials for waste management and recycling, leading to inadequate waste disposal practices. This, in turn, can result in pollution of land, water, and air, further exacerbating the environmental crisis.⁶⁶ Furthermore, the scarcity of fuel and energy resources caused by the blockade affects vital sectors such as agriculture, fisheries, and transportation. The agricultural sector struggles with limited access to irrigation water due to power shortages, impacting crop productivity and contributing to soil degradation. The coastal areas of the Gaza Strip face particular challenges, with restrictions on fishing imposed by the blockade.

The environmental equilibrium is significantly affected by the restrictions imposed on agricultural and hunting areas. The designated areas for farming constantly change, with varying distances permitted for pedestrian and farmer access. In 2008, pedestrians were allowed up to 300 meters from the fence, while farmers could approach up to 100 meters while working. However, with the initiation of a large-scale Israeli attack in December 2008, Palestinians were required to maintain a distance of 1000-1500 meters from the fence. These buffer lands account for approximately 35% of Gaza's cultivable land, much of which has been destroyed or contaminated by Israeli forces. Subsequent to a major military offensive in 2012, Israel temporarily eased these restrictions but later reinstated them. Furthermore, throughout the year, Israeli aircraft repeatedly spray pesticides on Palestinian lands near the border, causing damage to agricultural crops, even in areas exceeding 300 meters away from the fence, posing a direct threat to the environment.⁶⁷ Regarding fishing areas, according to the Oslo Accords, Palestinians are permitted to sail up to 20 nautical miles (approximately 37 kilometers) off the coast of the Gaza Strip. However, Palestinians are consistently prevented from reaching this distance. Israel arbitrarily imposes fishing limits within maritime boundaries that, at best, do not exceed 12 nautical miles. These restrictions on fishing areas and limited access to the sea directly impact the marine ecosystem and the livelihoods of fishermen, exacerbating the ecological imbalance.⁶⁸ Overall, the blockade has hindered the recovery of the environmental situation in the Gaza Strip

⁶⁶“Suffocation and Isolation: 17 Years of Israeli Blockade on Gaza”, *Euro-Mediterranean Human Rights Monitor*, Geneva, 2023, <https://euromedmonitor.org/en/gaza>, Accessed 18 May 2023.

⁶⁷ Ibid

⁶⁸ Ibid

by limiting access to resources, technology, and infrastructure necessary for environmental restoration and conservation. Addressing these challenges requires international cooperation, support, and the lifting of restrictions to enable effective environmental recovery efforts in the region.

Case study

Bombing of Khudair warehouse/Beit Lahia

Date of the bombing: May 15, 2021

During the aggression on the Gaza Strip in May 2021, Khudair Pesticides and Chemicals Company was subjected to a devastating air attack that destroyed the warehouse and large parts of nearby buildings. The dimensions of the aerial effects of the shells and smoke match the specifications of the 155 mm M150 high-explosive munitions manufactured by the Israeli arms manufacturer Elbit. The M150 ammunition is considered one of the advanced smoke shells, each of which is divided into five shells to emit very dense smoke. The attack caused a massive fire and a violent explosion, lasted for about 6 hours, resulting in the complete destruction of the site and significant damage to equipment and inventory. The area surrounding the attack was also greatly affected, as the fire released dangerous chemical fumes into the atmosphere and dangerous chemicals seeped into the nearby soil and water, the toxic smoke column affected an area of 5.7 square kilometers, covering Beit Lahia, its agricultural lands, and the densely populated Jabalia camp. It is estimated that it covered approximately 3,000 homes around the area, greatly impacting the surrounding environment and increasing the environmental challenges in the area.

Khudair Company is considered one of the most important suppliers of pesticides and chemicals in the sector, and has played a major role in meeting the needs of agriculture and industry in the region. Consequently, the attack had a significant impact on agriculture, the local economy and sustainable development.

"The bombing of the Khudair warehouse marked the onset of a deliberate series of attacks by Israeli occupation forces, targeting the economic infrastructure of civilians and the industrial sector. On May 17, just two days after the Khudair warehouse was bombed, the Fomco sponge factory near Jabalia camp was also targeted, resulting in a significant fire. Concurrently,

over six warehouses and factories situated in the industrial zone east of the Shujaiya neighborhood in Gaza were subjected to bombings.

This recurring pattern of attacks strongly suggests that the targeting and bombing of the Khudair factory was intentional, further corroborated by the use of incendiary weapons. This bombing was the first in a very clear series of assaults carried out by the Israeli occupation forces, in which they specifically targeted the industrial sector, civilians, and their economic infrastructure. A large fire broke out at the Fomco sponge factory close to the Jabalia camp on May 17, two days after the Khudair warehouse was bombed. More than six factories and warehouses in Gaza's industrial area east of the Shujaiya neighborhood were bombed on the same day.

This attack pattern suggests that the Khudair factory was deliberately targeted and bombed, which is also supported by the use of incendiary weapons in the attack. Each of these attacks puts the Palestinian population at risk of breathing in a variety of deadly toxic chemical gases, which could worsen the health and environmental conditions already present in the besieged Gaza Strip. The Israeli occupation forces bombed the Khudair chemical and agricultural materials warehouse, knowing that there are toxic chemicals in it. It amounts to the indirect use of chemical weapons. This is a completely prohibited act, and its perpetrators must be held accountable in accordance with the Rome Statute of the International Criminal Court.⁶⁹

The most prominent environmental impacts that may have long-term effects of this incident:

Environmental Pollution:

This incident resulted in the leakage of hazardous chemicals into the surrounding soil and water, leading to massive environmental pollution with negative impacts on plants, animals, and water resources in the surrounding area.

Risk of explosions, fires and air pollution:

⁶⁹ Al-Haq, "Al-Khader Warehouse Bombing: Indirect Chemical Warfare," *Al-Haq*, Ramallah, May 28, 2022, <https://www.alhaq.org/ar/monitoring-documentation/20057.html>. Accessed 30 May 2023.

The fire resulting from the attack caused explosions and violent fires. These fires contributed to the release of toxic chemical compounds and dangerous pollutants into the air, leading to air pollution and affecting air quality in the region.

Health effects:

The hazardous chemicals released lead to negative health effects on humans and animals exposed to them. This includes poisoning, skin diseases, and effects on the respiratory system.

Impacts on marine life and biodiversity:

The chemicals and pollutants that were emitted from the explosion and reached the sea affect marine life and marine ecosystems. These emissions also affect biodiversity in the region, leading to changes in the environmental composition and balance.

Legal analysis of this incident:

Violations of international humanitarian law:

The attack on Khudair Pesticides and Chemicals Company could be considered a clear violation of international humanitarian law, which strictly prohibits the targeting of civilians and non-military civilian structures during armed conflicts.

Violations of international human rights law:

This attack led to an increase in the level of pollution in the area, which led to a violation of the right of individuals to enjoy a clean environment, a right stipulated in the Universal Declaration of Human Rights, as every individual has the right to enjoy a clean and healthy environment.

Violation of environmental laws and legislation:

Leakage of hazardous chemicals into soil and water poses serious environmental risks. Which constitutes a violation of local and international laws and legislation that regulate environmental pollution and chemical safety.

International responsibility:

This attack constitutes an act that imposes international responsibility on Israel, as it is the occupying power behind the attack.

Civil liability and compensation:

Khudair Company and the affected individuals have the right to seek compensation from Israel or the military officials responsible for this attack under international laws.

2. Legal Basis of International Environmental Law

International law recognizes the importance of environmental protection whether in both peaceful and armed conflict times. Various legal frameworks, including international environmental law⁷⁰ and international human rights law, address the right to live in a clean and healthy environment⁷¹, emphasizing the importance of environmental protection and preservation. However, in light of the besieged Gaza Strip and the environmental consequences of Israeli violations, the emphasis shifts to the application of international humanitarian law during armed conflicts.

International humanitarian law establishes guidelines and principles for environmental protection during armed conflicts. It prohibits the use of warfare methods and means that cause excessive or widespread environmental damage. This includes the use of prohibited weapons such as white phosphorus and cluster bombs, which not only endanger human lives but also have severe and long-term environmental consequences. This study investigates environmental legal protection and aims to shed light on global efforts dedicated to preserving and aligning the environment with societal needs. Human activities continue to pose significant threats to ecosystems and natural resources, making environmental protection a pressing concern in today's world. In response, international organizations, governments, and communities have collaborated to create and implement legal frameworks that address these issues. The study will delve into the key international conventions, treaties, and regulations that govern environmental protection, more over it will shed the light on the local environmental law, and examine how they are applied in order to stop Israeli environmental violations in the Gaza Strip and help to recover the environmental situation there, by understanding the legal mechanisms and practices.

⁷⁰ International environmental law can be defined as the law that aims to adopt a set of rules and principles binding on states and individuals to avoid polluting the environment with its three elements: land, air, and water. International Environmental Law," *Environmental Science: In Context*, Detroit: Gale, 2005, Encyclopedia.com, <https://www.encyclopedia.com> , accessed July 20, 2023

⁷¹ The human right to a clean environment is one of the basic human rights referred to in Article 12 of the International Covenant on Economic and Social Rights of 1968, as confirmed by the United Nations General Assembly in its Resolution No. 45/94 of 1990 that it decides that everyone has the right to live in an environment that satisfies requirements of his health and well-being Ibrahim Muhammad Al-Anani, "Environment and Development: International Legal Dimensions," *International Policy Journal*, Issue 110, October 1992, pp. 116 et seq., p. 125

2.1 Sources of Environmental Protection in International Law:

The human right to a clean environment is part of civil, political, economic, social and cultural rights. This right is guided by several articles of the International Covenant on Economic, Social and Cultural Rights.

Article 11 of the International Covenant on Economic, Social and Cultural Rights recognizes the right of everyone to the enjoyment of the highest standards of physical and mental health. It also obliges States Parties to take the necessary measures to improve the work and life environment.⁷²

Article 12 recognizes the right of everyone to the enjoyment of the highest attainable standard of health. States are obligated to take the necessary measures to improve environmental conditions.⁷³

Through its repeated attacks on the Gaza Strip and targeting civilian facilities, especially those containing chemical and agricultural materials, Israel violated the right to a clean environment and the right to health. The use of military and phosphorus bombs can lead to environmental pollution and threaten the health of the population. The siege imposed on the Gaza Strip leads to environmental deterioration due to the difficulty of providing basic services. Failure to provide the necessary medical care to deal with cases of poisoning resulting from environmental pollution constitutes a violation of the right to health. In addition, chemical fires constitute a violation of the rights to life and the right to health.

There are many sources of environmental protection in international law varies between conferences and agreements, some of which provides direct protections, and others provides indirect protection, as follow:

⁷² *International Covenant on Economic, Social and Cultural Rights*, 16 December 1966, entered into force 3 January 1976, *United Nations Treaty Series*, vol. 993, p. 3

⁷³ *Ibid*, Article 12.

2.1.1 Environmental Protection within the Framework of International Conferences:

Several international conferences and agreements have been held, with environmental issues being the main focus of its activity can be summarized as follows:

Stockholm Conference of 1972:

In response to the growing environmental challenges and their escalating problems, the General Assembly called for an international conference on the human environment on December 3, 1968, on the recommendation of the United Nations Economic and Social Council. This conference was held in Stockholm, Sweden, from June 5 to June 16, 1972, with the theme "Only One Earth."⁷⁴ The conference focused on human activities that endanger the natural environment and pose significant risks to human well-being and even life. The conferees debated the possibility of achieving economic development while preserving the environment,⁷⁵ and at the end of their work, they issued a "Declaration on the Human Environment" emphasizing that the right to a clean environment is a human right, that every human being has the right to live in a healthy environment, and that he is responsible for its protection and improvement for the benefit of future generations.⁷⁶ This conference marks an important turning point in the history of the international system, as it marks the beginning of collective efforts to protect the global environment and save it from pollution disasters.

Nairobi Conference of 1982:

The Nairobi Conference, held in Kenya's capital from May 18 to 1982, addressed a wide range of environmental and development issues, particularly the challenges posed by rapid population growth in third-world countries. The conference acknowledged the need to tackle international conflicts, pollution, and poverty, as they exacerbate environmental threats. To ensure effective implementation, a mechanism known as the Nairobi Declaration with ten key points was established. These points identified critical environmental issues and proposed

⁷⁴ Abdel Hafez, Mohamed, Ratib, Muammar, *International Law of the Environment and the Phenomenon of Pollution: A Step Forward to Protect the International Environment from Pollution* (Cairo: Dar Al-Nahda Al-Arabia, 2007), p. 81

⁷⁵ Al-Hadidi, Alaa, "The Summit of the Earth and the Relationship between the North and the South," *Journal of International Politics*, Issue 110, 1992, p. 89

⁷⁶ Ibid

solutions that were consistent with the Stockholm Declaration and Action Plans.⁷⁷ The Nairobi Declaration marked an important step forward in the advancement of international environmental law and cooperation. It urged governments and individuals worldwide to take collective and individual responsibility for protecting our planet for future generations. However, despite numerous international and regional efforts at the time, the Nairobi Declaration's implementation encountered challenges. The lack of progress can be attributed to factors such as international conflicts, divisions, and the United Nations' limitations in effectively implementing the Nairobi Declaration.⁷⁸

Rio de Janeiro Conference of 1992:

The Earth Summit, officially known as the World Conference on Environment and Development, took place in Rio de Janeiro, Brazil, from June 3 to 14, 1992, under the auspices of the United Nations. With a large number of participants, this conference was the largest of its kind. A significant outcome of the conference was the adoption of the "Rio Declaration," which encompassed 27 principles aimed at guiding global management to ensure environmental preservation. Notably, sustainable development was a key focus, addressed in approximately 12 of the principles. The third principle specifically defined sustainable development as the implementation of the right to development in a manner that meets the present generation's developmental and environmental needs while ensuring the same for future generations.⁷⁹ In addition to the Rio Declaration, the conference produced an extensive working document called Agenda 21, which comprised 800 pages and outlined principles for sustainable development across various economic sectors. The Earth Summit emphasized the interconnectedness of the environment and development, as well as the links between poverty, environmental pollution, and the depletion of natural resources.⁸⁰ However, despite its significance, the conference fell short of meeting all expectations. It failed to address many critical environmental issues,

⁷⁷ Ibid

⁷⁸ Ibid

⁷⁹ The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Declaration on Environment and Development, Rio de Janeiro, 1992, United Nations, *United Nations Treaty Series*, vol. 31, p. 874

⁸⁰ Gertrude Pieratti and Luc-Jean Prat, "Law, Economy, Ecology, and Sustainable Development: Necessarily Complementary but Inevitably Ambiguous Relations," *Revue Juridique de l'Environnement*, No. 3, 2000, p. 424

particularly concerning the allocation of development aid from wealthy nations to poorer countries.

Johannesburg Conference of 2002:

Despite the numerous conferences devoted to discussing environmental and sustainable development issues, both environmental degradation and poverty have gotten worse. The General Assembly expressed a desire for a summit that would go beyond discussions and policies because it understood the need for real action and results. As a result, the Johannesburg conference was founded with the intention of putting commitments into practice. Despite the conference's agreement on objectives, timetables, and pledges, there were no simple answers to the problems of poverty and environmental degradation. It became clear that solving these urgent global problems requires constant actionable steps rather than magic solutions. Due to its emphasis on implementation, the Johannesburg conference's outcomes were not particularly noteworthy. The goals that were agreed upon were largely derived from earlier meetings, and no new treaties were signed. Nevertheless, some significant new goals were set, such as encouraging the production and use of chemicals in ways that do not endanger human health or the environment by 2020 and reducing the percentage of people who lack access to sanitary facilities and basic needs by half by 2015. Despite the fact that the conference fell short of achieving these objectives, they still represented significant steps toward addressing pressing issues.⁸¹

2.1.2 Environmental Protection within the Framework of International Agreements:

Vienna Convention for the Protection of the Ozone Layer 1988:

Researchers have been concentrating on the ozone layer depletion brought on by the overuse of various chemicals, particularly chlorofluorocarbons, since the 1970s. The Vienna Convention on the Protection of the Ozone Layer was established as a result of the United Nations Environment Program on March 22, 1985, and was further strengthened by the

⁸¹ New 2002 Johannesburg Summit, United Nations Conference on Environment and Development, Johannesburg, 2002, <https://www.un.org/ar/conferences/environment/johannesburg2002> , accessed July 2023.

Montreal Protocol in September 1987, recognizing the seriousness of this issue. The agreement aims to cut chlorofluorocarbon production by up to 50%. The overarching objective of this international agreement is to protect the ozone layer by putting in place appropriate measures that significantly lower global emissions of ozone-depleting substances, ultimately eliminating them with the help of contemporary scientific and technological advancements.⁸²

United nation Framework Convention on Climate change 1992:

In order to successfully address the issues brought on by climate change, it is essential to improve international cooperation. To that end, the United Nations Convention on Climate Change, a comprehensive global agreement on climate change, was ratified by all nations on May 9, 1992. The Kyoto Protocol was established on December 21, 1997, within the framework of the Convention, building upon this agreement. The protocol aimed to put into practice the Convention's commitments and strengthen the group's response to climate change, which was at the time considered urgent. Since the early 20th century, when research on the Earth's atmosphere revealed that the warming of the planet's surface caused by greenhouse gases is a natural phenomenon, people have been worried about climate change. But as anthropogenic emissions from numerous industrial activities started to significantly contribute to this warming trend, the situation became dangerous. As a result, the annual average global temperature has increased noticeably.⁸³

Convention on Biological Diversity 1992:

The Convention on Biological Diversity, which was finalized on June 5, 1992, in Rio de Janeiro, underscores the importance of maintaining ecological balance by preserving and responsibly utilizing biological diversity. In recognition of the immense value of biodiversity, participating nations commit to the following aims outlined in Article 1 of the Convention:

- 1) Conservation and sustainable utilization of biological diversity.
- 2) Fair distribution of benefits derived from the utilization of natural resources.
- 3) Additionally, the treaty obliges the parties to establish a comprehensive strategy called a biodiversity action plan. This plan serves as a roadmap for translating the Convention's

⁸² Hazaa, Rashid Adnan, "Warming and Our Arab World," *The Arab Future Magazine*, Issue 494, 2000, p. 15.

⁸³ United Nations Framework Convention on Climate Change, Kyoto Protocol, December 1997, entered into force February 2005, *United Nations Treaty Series*, Vol. 2303, p. 148

objectives into practical measures. It aligns with the specific provisions laid out in its articles, with particular emphasis on Articles 6 and 26, and ensures the full implementation of all the Convention's provisions.⁸⁴

Basel Convention 1992:

The Basel Convention is an international treaty that aims to control the transboundary movement of hazardous wastes and ensure their environmentally sound management. Adopted in 1989 and enforced in 1992, the convention has been ratified by 188 countries. Its primary objective is to minimize the generation of hazardous wastes, promote their safe handling, and prevent illegal dumping or disposal in developing countries. The Basel Convention establishes a framework for the environmentally sound management of hazardous wastes, including their minimization, proper labeling, packaging, and transportation. It also promotes cooperation among nations to share information, technologies, and best practices related to waste management. The convention plays a crucial role in protecting human health and the environment by regulating the global trade and disposal of hazardous wastes.⁸⁵

The Rotterdam Convention 1998:

The Rotterdam Convention is an international treaty established to promote shared responsibilities in the import and export of hazardous chemicals and pesticides. The convention aims to protect human health and the environment by ensuring that countries have access to information about the potential risks posed by these substances. It facilitates the exchange of information between exporting and importing countries, enabling informed decisions on the import and use of hazardous chemicals. The Rotterdam Convention also encourages cooperation and assistance among countries to effectively manage the risks associated with these substances. Its objective is to enhance the safe handling, use, and disposal of hazardous chemicals worldwide.⁸⁶

⁸⁴ **Sandrine Maljean-Dubois**, *Les rapports entre le droit de l'OMC et le droit de l'environnement* (Bruxelles: Editions Bruylant, 2003), p. 120

⁸⁵ Mohamed Fawzy Ben Chaaban and Mohamed Nasser Boughazala, *Protecting the Environment from Pollution with Hazardous Wastes in the Light of the Provisions of the Basel Convention of 1989*, PhD dissertation, Faculty of Law, University of Algiers 1, 2018, p. 26 http://biblio.univ-alger.dz/jspui/bitstream/1635/14782/1/BEN%20CHAABANE_MOHAMED%20FAOUZI.pdf , accessed 14 June 2023

⁸⁶ Marwan Mansour Zayed, "Evolution of Ways to Pay the Liability of the Maritime Carrier (Since the Brussels Convention 1924 Until the Rotterdam Rules 2008)," *Journal of Legal and Economic Research - Menoufia*, vol. 52, no. 4, May 2021, pp. 111–161, DOI: 10.21608/jslem.2021.182827 .

There are many other international agreements that include within their framework the protection of the environment and the need for people to enjoy a clean environment.

2.1.3 Environmental Protection Within The Framework Of International Humanitarian Law:

During armed conflicts, laws and legal provisions play a critical role in protecting the environment. This role is based on international humanitarian law provisions, which are regarded as the primary and most effective source of legal protection for the environment during these conflicts. International agreements related to environmental protection in international humanitarian law can be divided into two categories: those that directly provide for environmental protection and those that provide for indirect environmental protection.⁸⁷ These agreements promote and encourage environmental principles and standards to be respected and followed in armed conflicts, thereby promoting environmental preservation and reducing negative impacts on environmental systems and public health.

2.1.4 International Humanitarian Agreements That Directly Protect the Environment:

The direct protection of the environment is explicitly stated in international humanitarian law via conventions and agreements that specifically address the environment and its protection during times of armed conflict. When we talk about direct environmental protection in the context of international humanitarian law, we're talking about the agreements that were specifically designed to protect the environment during armed conflicts. These treaties include provisions and language that specifically mention the environment and its preservation, such as The Convention on the Prohibition of Military or any Hostile Use of Environmental Modification Techniques of 1976 and Additional Protocol I of 1977, which is an annex to the four Geneva Conventions of 1949.⁸⁸

- **Convention on the Prohibition of Military or any Hostile Use of Environmental Modification Techniques of 1976:**

⁸⁷ Ibid.

⁸⁸ Ibid

This Convention was established under the auspices of the United Nations in response to the environmental damage caused by the Vietnam War. The use of chemical weapons by the US during this war destroyed approximately 150,000 acres of agricultural land and over 500,000 acres of forest. This environmental destruction is estimated to have resulted in a 5% decrease in forest area and a 20% decrease in agricultural productivity.⁸⁹ This convention was discussed during the Disarmament Committee Conference and was officially adopted by the United Nations General Assembly on December 10, 1976. The convention entered into force on October 5, 1978, with two main goals in mind:

A- Contribute to stopping the arms race and comprehensive disarmament.

B- Protecting the environment against the use of modern science and technology to bring about harmful changes to the environment for military purposes.⁹⁰

This agreement restricts the military or hostile use of environmental change technologies that can cause extensive or long-lasting damage to the environment, with the intention of destroying, damaging, or harming any state party to the agreement. It also prohibits supporting, encouraging, or inciting other countries, groups, or international organizations to engage in activities that go against the agreement's provisions.⁹¹ These restrictions apply to the dynamics, composition, and formation of the Earth, including its biota, lithosphere, hydrosphere, and atmosphere, as well as the dynamics, composition, and formation of outer space. It's important to note that the agreement solely prohibits the military use of environmental change techniques while allowing their peaceful use for environmental preservation, improvement, and other peaceful purposes.⁹² Each state party to the agreement commits to taking necessary measures, in line with their constitutional procedures, to prevent and prohibit any activity that violates the agreement within their jurisdiction or control. The agreement also stated that any state party to the agreement who has reason to believe that another state party to the agreement is violating the obligations stipulated may file a complaint with the Security Council, accompanied by

⁸⁹ Muhammad al-Mahdi Bakraoui, *Protecting the Environment during Armed Conflicts: A Comparative Study between Islamic Jurisprudence and Public International Law* (Master's thesis, Haj Lakhdar Batna University, Algeria, 2010), p. 68.

⁹⁰ Ibid

⁹¹ Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, New York, 18 May 1977, entered into force 5 October 1978, *United Nations Treaty Series*, vol. 1108, p. 151, Article 1.

⁹² Ibid. Article 3.

possible evidence of its validity, and the Security Council will investigate the matter and conduct investigations, and then report the results of the investigation to the treaty's states parties.⁹³ Accordingly, this agreement was not reached to protect the environment from the means and methods of warfare used during the outbreak of hostilities, such as the use of biological, chemical, or nuclear weapons, or some conventional weapons that disrupt natural balance and have negative environmental consequences. Rather, it came to protect the environment from their use as a weapon of war in armed conflict by the parties to the conflict.

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During periods when the four Geneva Conventions were in force, there were instances of violations, revealing deficiencies in international humanitarian law. These shortcomings were particularly evident in the provisions for special protection of war victims.⁹⁴ As a response, the first Additional Protocol was introduced. The First Additional Protocol to the Geneva Conventions was signed on 12 August 1949, for the protection of victims of international armed conflicts, which consists of 102 articles and two annexes.⁹⁵

The first protocol of 1977 directly addressed the protection of the environment during armed conflicts through Articles 35 and 55. Article 35 explicitly prohibited the use of warfare means or methods intended or expected to cause severe, widespread, and long-term damage to the natural environment. Likewise, Article 55 emphasized the need to consider protecting the

⁹³ Ibid. Article 5.

⁹⁴ Geneva Conventions (I–IV) of 12 August 1949, *United Nations Treaty Series*, vol. 75: Convention I, p. 31; Convention II, p. 85; Convention III, p. 135; Convention IV, p. 287. Entered into force 21 October 1950.

The first agreement: for the amelioration of the condition of the wounded and sick in the armed forces in the field.

The second agreement: for the improvement of the condition of the wounded and sick of the Naval Armed Forces.

Third Convention: Concerning the Treatment of Prisoners of War.

Fourth Convention: Concerning the Protection of Civilians during War.

These agreements constitute what is known as the (Geneva Law), which constitutes the bulk of the laws of war and the rules pertaining to persons.

⁹⁵ The number of countries ratifying the first additional protocol attached to the four Geneva Conventions up to 1/2/2005 reached 162 countries. As for Palestine, on June 21, 1989, the Federal Department of Foreign Affairs received a letter from the Permanent Representative of Palestine to the United Nations in Geneva stating that the Executive Committee of the PLO The Palestinian Authority decided to accede to the four Geneva Conventions of 1949 and their additional annexes of 1977, and the Swiss government notified the states parties of that on September 13, 1989. Palestine's accession to the Geneva Conventions and Additional Protocols was notified by the Swiss Federal Department of Foreign Affairs on 13 September 1989. See also the ratification status of the First Additional Protocol as of 1 February 2005, *United Nations Treaty Collection*.

natural environment from such harm during combat.⁹⁶ It prohibited the use of combat methods and means that could cause damage to the environment or harm the health and survival of the population. Destructive attacks against the natural environment were also prohibited.

Article 35 clearly indicated that any combat method or means expected to result in significant environmental damage, even if unintentional, was prohibited. The article prevented conflict parties, whether states or non-state actors, from using weapons that could cause long-term and widespread damage to the natural environment.⁹⁷

These provisions focused on providing dedicated protection for the environment itself, rather than merely accidental protection for civilians or civilian objects. They outlined specific conditions, namely the use of environmentally harmful weapons by belligerents and the occurrence of severe, widespread, and long-term damage as a result of armed conflict. Consequently, a country responsible for such damage would have violated the rules and conventions of the Geneva Conventions, requiring accountability for their actions.

Based on the above, it is evident that these two texts hold significant importance within international humanitarian law as they directly address the protection of the environment during armed conflicts. Their significance arises from the following reasons:

- 1) These texts are the first two international humanitarian agreements that explicitly and directly tackle the environment and its protection in times of armed conflicts. While the previous 1976 Convention on the Prohibition of the Use of Techniques to Change the Environment for Military or Other Purposes did mention environmental protection, it primarily falls under a different branch of public international law, namely disarmament law, rather than purely humanitarian law.
- 2) These two articles have expanded the scope of legal protection for the environment, encompassing both natural and unnatural aspects. They have also broadened the scope of protection against combat methods and means, irrespective of whether they are employed intentionally or unintentionally. This is evident from the inclusion of the phrase "or may be expected from it" in the wording of the articles.

⁹⁶ Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), The Hague, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 183, Article 55.

⁹⁷ *Ibid*

- 3) The texts do not reference the principle of military necessity, which would allow for the lifting of legal protection for the natural environment under urgent military circumstances.
- 4) These provisions aim to restrict conflicting parties, who often prioritize military gains even at the cost of using prohibited weapons outlined in international conventions and texts. The use of such weapons would render the responsible party criminally liable and classified as committing international war crimes if investigations substantiate these actions as international crimes.⁹⁸

In summary, these texts are of utmost importance in international humanitarian law as they specifically address the environment's protection during armed conflicts. They represent a significant milestone by explicitly incorporating environmental considerations and expanding the scope of protection against combat methods, regardless of intent. Moreover, they emphasize accountability and seek to deter the use of prohibited weapons in pursuit of military objectives. From the preceding discussion on the direct agreements for environmental protection, it is evident that the Convention on the Prohibition of the Use of Techniques for Changing the Environment and the First Geneva Protocol serve distinct purposes, prohibiting two different forms of aggression against the environment. The first protocol prohibits ecological warfare, which involves the use of combat methods that disrupt the essential balance of nature, while the Convention addresses geophysical warfare resulting from deliberate interference with natural processes. It should be noted that the Convention on the Prohibition of the Use of Environmental Alteration Technologies applies during both times of peace and war, aiming to safeguard the environment from deliberate harm. On the other hand, the Protocol is specifically applicable during times of war, seeking to protect the environment from both intentional and unintentional damage. Furthermore, these two agreements interpret certain terms differently. The phrase "extremely widespread and long-term" in the Protocol does not carry the same meaning as intended in the Convention on the Prohibition of the Use of Environmental Modification Technologies. Additionally, the cumulative specifications of environmental damage in the Protocol are each sufficient to invoke the provisions of the Convention. Moreover, the scope of the Protocol's application is limited to parties involved in international armed conflicts, providing protection against all forms of destruction caused by combat methods. In contrast, the

⁹⁸ Faris Ahmed Al-Dulaimi, *The International Responsibility of the United States of America for Damage to the Iraqi Environment* (Master's thesis), League of Arab States, Cairo, 2009, p. 59. Referred to Hisham Bashir, *Environmental Protection in Light of the Provisions of International Law*.

Convention applies in any case where environmental alteration techniques are used for military or hostile purposes, encompassing both international and non-international armed conflicts. The Convention protects the environment specifically from destruction resulting from the modification of the Earth's composition for military or other hostile intentions, as long as it affects a state party to the Convention.

In conclusion, although these two treaties were separately established with differing objectives, application scopes, and specifications of damage, they are complementary and do not entail complete duplication of means and goals.

2.1.5 International Agreements That Provide for The Protection of The Environment Indirectly:

The purpose of international humanitarian law is to safeguard individuals during armed conflicts, but it is essential to recognize the inherent link between people and the environment. Consequently, the protection granted to humanity in times of conflict should be interpreted in a comprehensive manner, encompassing both the well-being of individuals who form part of the natural environment and the preservation of the environment they inhabit. The environment in its broadest sense is not specifically mentioned in the international humanitarian law treaties. This does not imply that these treaties do not contain clauses that indirectly safeguard the environment, though. Agreements that are centered on defending public and private property, vital infrastructure, vital resources required for the survival of the population, and civilian objects not directly involved in military operations can be found protecting the environment indirectly.⁹⁹

Although the term "environment" is not used specifically in these agreements, they offer safeguards for components that contribute to the health of the environment. There are numerous texts and agreements in the international agreements and documents that make up international humanitarian law that require the parties to a conflict to protect the environment and safeguard its wealth and resources from the risks of pollution and devastation. We cite several of these agreements as an example in this regard.

- **The Forth Hague Convention of 1907 on respecting the laws and customs of war on land**

⁹⁹ Ibid

Many texts in the agreement contribute to providing indirect environmental protection. This agreement reaffirmed the principles stated in the St. Petersburg Declaration of 1868,¹⁰⁰ where Article 22 of the regulations related to the laws and customs of land war annexed to this agreement stated that "the belligerents have no absolute right to choose Means of causing harm to the enemy," and Article 23 stated that "it is forbidden to destroy or seize the enemy's property unless the necessities of war absolutely require this destruction or sequestration." It also stated that among the prohibitions for belligerents were: 1- the use of poison or weapons, 2- the declaration that no life would be spared, and 3- the use of weapons, missiles, and resources that cause unjustified injury and pain.¹⁰¹ Even though the regulations didn't mention the environment specifically, what is stated therein undoubtedly applies to the environment, indicating the necessity of working to protect environmental elements from the dangers of war as much as possible, in addition to what it bestowed on those restrictions of a positive and legal nature after they were just general guidelines that didn't rise to the rank of legal rules. In addition to Article 23 of this agreement, which is one of the earliest environmental protection laws during times of armed conflict, many other articles in the agreement, such as Articles 27, 28, 46, and Article 56, also mentioned indirect environmental protection.¹⁰²

- **The Fourth Geneva Convention for the Protection of Civilian Persons in Time of War 1949**

It was signed on August 12, 1949, although it did not explicitly refer to environmental protection, the provisions it contained, particularly the prohibition on the destruction of property other than in accordance with military operations, provide protection for the natural environment, particularly Article 53 of it, which prohibits the destruction of immovable and movable property.¹⁰³

- **Convention for the Protection of Cultural Property in Armed Conflict of 1954**

¹⁰⁰ Hammad Kamal, "International Humanitarian Law and the Protection of Heritage and the Environment during Armed Conflicts," in *International Humanitarian Law, Prospects and Challenges*, Part 2, 1st ed., Al-Halabi Human Rights Publications, Lebanon, 2005, p. 154

¹⁰¹ Hague Convention (IV) respecting the Laws and Customs of War on Land, The Hague, 18 October 1907, entered into force 26 January 1910, United Nations Treaty Series, vol. 1, p. 631, Article 23.

¹⁰² Ibid

¹⁰³ Nawal Ahmed Basij, *International Humanitarian Law* (Beirut: Al-Halabi Human Rights Publications, 2010), p. 184.

Cultural property is one of the casualties of war. Many cultural monuments were vandalized and looted during the First and Second world wars, as the previous period revealed its barbarism against culture.¹⁰⁴ These prompted countries to sign The Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict in 1954. It was accompanied by implementing regulations and the Optional Protocol, which prevented the export of cultural property from occupied territories and guaranteed its return at the end of hostilities.¹⁰⁵ It is the first agreement that specifies what is meant by cultural property in general and in detail, regardless of where it came from or who owns it.¹⁰⁶

The agreement provided a clear definition of cultural property, encompassing the following elements:

- a) Movable or immovable assets of significant importance to a nation's cultural heritage, including architectural, artistic, or historical structures, whether religious or secular, archaeological sites, groups of buildings with collective historical or artistic value, artifacts, manuscripts, books, and other objects with historical, archaeological, or artistic value. It also includes scientific collections, important book collections, archives, and copies of the aforementioned properties.
- b) Buildings primarily designed and effectively utilized for safeguarding and exhibiting movable cultural property mentioned in point (a), such as museums, major bookstores, archive facilities, and protective bunkers designated for the preservation of movable cultural property during armed conflicts.
- c) Centers housing extensive collections of cultural properties outlined in points (a) and (b), referred to as "memorial building centers."¹⁰⁷

Thus, it classified cultural property into three categories: movable or immovable property of great importance to people's heritage, buildings intended primarily and effectively for the protection and display of cultural property, and memorial building centers.

¹⁰⁴ Ali Khalil Ismail Al-Hadithi, *Protection of Cultural Property in International Law: A Comparative Applied Study* (Amman: Dar Al-Thaqafa for Publishing and Distribution, 1999), p. 35

¹⁰⁵ Protocol to the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, The Hague, 14 May 1954, entered into force 7 August 1956, *United Nations Treaty Series*, vol. 249, p. 240, Article 1.

¹⁰⁶ Ibid.

¹⁰⁷ Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, The Hague, 14 May 1954, entered into force 7 August 1956, *United Nations Treaty Series*, vol. 249, p. 240, Article 1.

When it comes to the relationship between safeguarding cultural property and environmental protection, a significant portion of international environmental jurisprudence recognizes the inclusion of global cultural heritage, in its diverse forms, within the broader concept of the environment. This recognition stems from the acknowledgment of its exceptional historical value. The World Heritage Convention, adopted by the General Conference during its seventeenth session in Paris on November 16, 1972, reflects the shared principles of respecting both the natural and cultural aspects of the environment. It is understood that damage inflicted upon the environment cannot be fully rectified by restoring it to its original state. Consequently, cultural property is considered a component of the built environment, leading to the provision of legal protection for this aspect within the realm of international humanitarian law. Ultimately, The Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, along with its protocols, stands as an international agreement that offers protection specifically for the built environment, encompassing cultural heritage.¹⁰⁸

- **Additional Protocols I and II of 1977 to the four Geneva Conventions of 1949**

Although the primary focus of the first Additional Protocol of 1977 is the direct protection of the environment during armed conflicts, it also contains provisions that indirectly safeguard the environment. These provisions are found in various articles, such as Article 53 which safeguards cultural objects and places of worship, Article 54 which protects objects essential for civilian survival, and Article 56 which ensures the protection of works and installations containing dangerous forces. It is important to note that the second protocol also includes texts that indirectly protect the environment, and we will explore these texts in addition to the ones found in the first protocol.¹⁰⁹

Article 53, which came under the heading of protecting cultural objects and places of worship, is considered one of the first texts that indirectly contribute to the protection of the environment.

¹⁰⁸ Fthorio Minetti, "New Horizons for the Protection of Cultural Property in the Event of Armed Conflict: Entry into Force of the Second Protocol to the Hague Convention of 1954," *International Review of the Red Cross*, No. 854, 31 December 2004, p. 2, <https://www.icrc.org/ar/doc/assets/files/other/new-perseptives-fitromainneti.pdf>, accessed 14 June 2023

¹⁰⁹ Saeed Salem Gouili, *Introduction to the Study of International Humanitarian Law* (Cairo: Dar Al-Nahda, 2002), p. 283.

International humanitarian law recognizes the significance of providing special protection to these objects against military attacks due to their cultural and spiritual value to civilian populations. These objects not only hold cultural and civilizational importance for communities but also represent a heritage for humanity as a whole. Article 53, part of the first protocol, offers several advantages that indirectly protect the environment, particularly the built environment. As part of the chapter on the protection of civilian objects, its provisions extend to the built environment since it is considered a component of civilian objects. It is important to note that the prohibition outlined in the article applies to hostile acts, a term that encompasses a wide range of actions beyond mere destruction or damage, thereby expanding the scope of protection. Furthermore, Article 53 explicitly prohibits reprisals or deterrence targeting cultural objects and places of worship.¹¹⁰

Regarding the second additional protocol associated with the four Geneva Conventions, Article 16 focuses on the protection of cultural objects and places of worship, aligning with the wording of Article 53 in the First Protocol. However, there is an exception that explicitly prohibits these objects from being targeted in deterrence attacks. On the other hand, Article 54, which deals with the protection of objects and substances that are necessary for the survival of the civilian population, is noteworthy because it is one of the most significant provisions of Protocol I that helps provide protection for a variety of items and materials that play a significant role in the natural environment surrounding armed conflicts, as acknowledged by this Protection in Article 14 of Additional Protocol II.¹¹¹

It is important to note that the aforementioned items are mentioned as examples only and not as a limitation of the protection provided, which enables this protection to be expanded to cover other environmental elements that are deemed essential for the survival of the civilian population, such as food stores. Along with civil stations and stations that supply citizens with

¹¹⁰ Ibid.

¹¹¹ Starvation of civilians as a method of warfare is prohibited. Hence, it is prohibited, to this end, to attack, destroy, remove or render useless objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for their production, crops, livestock, drinking water installations and supplies, and irrigation works.

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), Geneva, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 609, Article 14.

essential oil derivatives, it also includes residences, factories, schools, hospitals, and other facilities.¹¹²

The unique feature of Article 54 is that it forbids the attacker from using a claim of military necessity as a justification for destroying, attacking, moving, or incapacitating items and materials vital to the survival of the civilian population. This is because the harm caused by attacking these items and the suffering that results from it far outweighs any potential military benefit. But in one instance, found in Paragraph 5, it made reference to a military necessity and only authorized the defender of his national territory against external invasion.¹¹³

An essential text that indirectly contributes to the protection of the environment during armed conflicts is Article 56¹¹⁴, titled "Protection of Engineering Works and Installations Containing Dangerous Forces," which corresponds to Article 15'¹¹⁵ in the second protocol. Both articles aim to ensure the necessary safeguards for the protection of such works and installations due to their significance and potential threat to civilians. Article 56, plays a role alongside Article 54, which safeguards objects and materials essential for the survival of civilian

¹¹² Fritz Kalshoven and Liesbeth Zegveld, *Controls Governing War: An Introduction to International Humanitarian Law* (Geneva: International Committee of the Red Cross, 2004), p. 124.

¹¹³ Ibid.

¹¹⁴ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), The Hague, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 183, Article 56.

1- Engineering works or installations that contain dangerous forces, namely dams, bridges, and nuclear power stations, shall not be the subject of attack, even if they are military objectives, if such an attack is likely to cause the release of dangerous forces that lead to heavy losses among the civilian population. Nor shall other military objectives located at or in the vicinity of such works or installations be subjected to attack if such an attack is liable to cause the release of dangerous forces from the works or installations causing heavy losses among the civilian population.

2- The special protection against attack stipulated in the first paragraph shall cease in the following cases:

a) With regard to dams or bridges, if they are used for other than their normal uses in support of military operations in a regular, significant and direct manner, and such an attack is the only possible way to end that support
 b) with respect to nuclear power plants, if such power plants provide electrical energy in regular, significant and direct support to military operations and such an attack is the only feasible way to end such support
 c) With regard to other military objectives located at or in the vicinity of such engineering works or installations, if they are used in regular, significant and direct support of military operations, and such attack is the only possible way to end such support.

3 - The civilian population and individual civilians shall, in all circumstances, enjoy all types of protection guaranteed to them by international law, including the protection afforded by the preventive measures stipulated in Article 57. If the protection ceases or if any of the engineering works, installations or military objectives is exposed, mentioned in the first paragraph of the attack, take all practical precautions to avoid the release of dangerous forces.

¹¹⁵ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), Geneva, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 611, Article 15.

populations. Together, these provisions offer crucial protection for various environmental components surrounding the battlefield.¹¹⁶

Article 54 explicitly prohibits attacks, destruction, displacement, or disruption of natural environment elements such as food supplies, agricultural areas, crops, livestock, and drinking water facilities. Additionally, Article 56 prohibits attacks on specific civilian environmental elements, including dams, bridges, and nuclear power stations. These regulations ensure the necessary protection for the environment during armed conflicts.¹¹⁷

2.1.6 International Agreements on Weapons

Technological and technical progress in the field of armaments has contributed to the emergence of various and numerous types of weapons that have a significant environmental impact and have been used by many warring countries, necessitating the intensification of efforts aimed at preventing wars in which such weapons are used. In fact, prohibiting the use of certain types of weapons has historical significance. The ancient Greeks and Romans forbade the use of poisons and poisonous weapons in battle, just as the ancient Indian civilization forbade the use of weapons of mass destruction.¹¹⁸ The concept of prohibiting the use of certain weapons evolved into international laws and norms known as international disarmament law, which is one of the branches of international general law. and this branch is concerned with eliminating or limiting the means of waging war through negotiation to reach an international agreement.¹¹⁹

It is worth noting that international humanitarian law and international disarmament law are inextricably linked. whereas Article 36 of Protocol I states that any High Contracting Party must check to see if studying, developing, or acquiring a new weapon or tool of war, or adopting a method of war, is prohibited in all or some cases by virtue of this Protocol or any other rule of international law to which the High Contracting Party is bound.¹²⁰

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ Chahrazed Boudjema, "Protection of the Environment in International Humanitarian Law," *Journal of Comparative Legal Studies*, vol. 5, no. 2, 28 December 2019, pp. 208–228.

¹¹⁹ Gouili, *ibid.*, footnote 109, p. 85.

¹²⁰ In February 2007, Secretary-General Ban Ki-moon proposed to the General Assembly the establishment of an office headed by a High Representative to strengthen the organization's ability to manage peace and security operations and advance the disarmament program. On April 1, 2007, the Department for Disarmament Affairs was

Despite their interdependence, the considerations underlying international humanitarian law and international disarmament law differ. The first was motivated by humanitarian concerns, while the second was motivated by national and evidence security concerns.¹²¹ At the same time, each of them contributes to environmental protection during armed conflicts. The agreements used the term "environment" in its modern sense, and as a result, international weapons treaties provide a legal basis for environmental protection during armed conflicts.

There are two types of these agreements that will be explained in this section:

The first is the international agreements on the partial ban of some weapons, and the second is the international agreements on the comprehensive ban of some weapons.

- **The International Agreements on The Partial Ban of Some Weapons**

The international community's recognition of the damage caused by wars as a result of the use of certain types of harmful weapons has resulted in the signing of numerous international treaties that partially prohibit the use of certain weapons.

- **International Agreements on The Prohibition of Use:**

The prohibition of the use of certain types of weapons during armed conflicts came in several places in international humanitarian law as follows:

- a. Protocol of 1925 prohibiting the use of asphyxiating, poisonous or similar gases, and bacteriostatic means in warfare.

Whereas the use of poisonous gases dates back to World War I, when the Germans used chlorine gas on Allied soldiers, and due to the significant losses caused by the use of poisonous gases, it was common to use all types of these materials during the war.¹²² This prompted the League of Nations to convene an international conference in Geneva, which resulted in the adoption of this protocol prohibiting the use of poisonous gases and similar agents in warfare.

Examining the characteristics of the prohibited substances and the extent of the ban, we can discern the environmental safeguards outlined in the protocol. It addresses the prohibition

named the United Nations Office for Disarmament Affairs, and Mr. Sir Ged Duarte from Brazil, High Representative for Disarmament Affairs. _ See Disarmament Yearbook, Volume 32, Part One, 2007, pg. 51

¹²¹ Ibid

¹²² Ahmed Medhat Islam, *Chemical Warfare*, Science and Life Series 33 (Cairo: Egyptian General Book Organization, 1993), p. 9

of suffocating or toxic gases, or analogous toxic materials, without providing a rigid or exclusive definition for them. Regarding the scope of the prohibition, it is specific to the utilization of suffocating or poisonous gases and comparable substances.¹²³ Consequently, it extends protection to the entire natural environment, encompassing both its living and non-living elements. Simultaneously, it offers preventative safeguards for the environment against the deployment of suffocating gases, similar substances, and bacterial agents in times of armed conflicts.

- a. Convention on Certain Conventional Weapons of 1980 and its Protocols, this is the United Nations Convention known as the Convention on Inhumane Weapons, which came into force in 1983.¹²⁴ It deals with the prohibition or regulation of specific conventional weapons that are considered excessively harmful or with indiscriminate effects. The Convention and its protocols contain clauses that aid in protecting the environment by prohibiting actions that could result in significant harm or indiscriminate effects on the environment. Hereby we will delve into the Convention and its Second, Third, and Fifth Protocols, as they have a direct tie to the focus of our study.

The Convention, as stated in its preamble, explicitly prohibits the use of methods or means of warfare that are intended or anticipated to inflict extensive, lasting, and severe damage on the natural environment.¹²⁵ It essentially codifies the principle of prohibiting unnecessary suffering, wherein the term "suffering" encompasses harm not only to human beings but also to civilian objects. Consequently, this agreement encompasses the broader definition of the environment, encompassing both the "natural and constructed" aspects.¹²⁶

The second protocol of the Convention deals with prohibiting or limiting the use of mines, booby-traps, and other similar devices because advancements in mines production have increased the associated environmental risks, which are not only limited to soil and vegetation but also now include water, impeding the use of land and its investment in construction and

¹²³ Mamdouh Hamed Attia, *Weapons of Mass Destruction in the Middle East between Doubt and Certainty*, 1st ed. (Cairo: Dar Al Thaqafa Publishing House, 2004), p. 14

¹²⁴ Ibid.

¹²⁵ Fourth paragraph of the preamble to the 1980 Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, Geneva, 10 October 1980, entered into force 2 December 1983, *United Nations Treaty Series*, vol. 1342, p. 137.

¹²⁶ Ibid.

agriculture.¹²⁷ As a result, a protocol to the Convention was required that forbade the use of these mines.

The protocol has actively contributed to protecting the environment in multiple ways. It offers comprehensive environmental protection by prohibiting the indiscriminate use of weapons. Such use is deemed indiscriminate when these weapons are not directed at military targets and when there is uncertainty about whether the location serves civilian purposes, such as a residence, school, or place of worship, the utilization of these weapons is forbidden.

Regarding the third protocol concerning the restriction or prohibition of incendiary weapons, its relevance to environmental protection is evident through the explicit mention of the prohibition against targeting forests and other vegetated areas with incendiary weapons. This prohibition holds unless these natural features are being used to shield or hide combatants or other military objectives or if they themselves are military objectives. The protocol provides clarity on what constitutes incendiary weapons in Article 1, defining them as any armament or ammunition primarily designed to ignite objects or cause burns to individuals through the flames and heat produced by a chemical reaction of a substance fired at the target.¹²⁸

Upon analyzing this text, we can conclude that the protocol explicitly highlights the protecting of forests and various forms of vegetation within the living natural environment. However, this protective scope extends to encompass other elements of the natural environment as well. When combustion occurs, leading to the destruction of organic soil components, moisture loss, and harm to diverse animal habitats, it also results in air pollution. Furthermore, the protocol's protective ambit isn't confined solely to the natural environment; it also extends its shield to the constructed environment. It achieves this by categorically prohibiting the targeting of civilian objects with incendiary weapons under all circumstances. The act of destroying civilian objects through this method is a wartime strategy, deemed a war crime, and subject to penalties related to environmental assault.

¹²⁷ Ahmed Abdel Wanis, "International Protection of the Environment in Times of Armed Conflict," *Egyptian Journal of International Law*, vol. 52, 1996, pp. 61 et seq.

¹²⁸ Incendiary materials are characterized as chemical compounds that have an incendiary effect and meet certain conditions for military use, the most important of which is that they give a large amount of fire, which results in the difficulty of extinguishing them, as well as their ability to spread while giving them a high temperature, and examples of them are white phosphorus.

Protocol III to the Convention on Certain Conventional Weapons (CCW), 10 October 1980, entered into force 2 December 1983, *United Nations Treaty Series*, vol. 1342, p. 249, Article 2, paragraph 4.

regarding the fifth protocol pertaining to explosive remnants of war, it stands as the first international agreement designed to tackle the issues associated with these remnants. In doing so, it indirectly serves as a safeguard for the environment, given that the natural environment frequently suffers as a consequence of these war remnants. Ultimately, it provides post-conflict environmental protection by eliminating the deadly aftermath left by these conflicts.¹²⁹

- **International agreements on the comprehensive ban of some weapons**

Legislation and accords mandating the comprehensive prohibition of certain weapons are fundamental instruments within the global community's endeavors to uphold worldwide peace and security, while concurrently protecting the environment and human rights. These legal measures arise in the wake of painful historical incidents wherein the deployment of specific arms resulted in extensive devastation and adverse consequences for both the environment and civilian populations. Within the framework of these agreements, the utilization of such weapons is outright forbidden, with the primary aim being to prevent the recurrence of the damages and deleterious effects previously caused by their employment. These laws signify an unwavering effort to curtail environmental degradation and mitigate the severe humanitarian consequences that may arise from the use of these weapons.

Here are the most important of these agreements:

- **The convention on the prohibition of the development production and stockpiling of bacteriological (biological) and toxin weapons and their destruction in 1972**

Biological weapons are not a new phenomenon, as they are classified as weapons of mass destruction that endanger humans and living organisms. These weapons have the potential to spread epidemic diseases, and their use was first documented in the twelfth century, specifically in 1763 against American Indians in America. It was also used by Japan against Russian forces in 1939, and the Vietnam War witnessed widespread use of these weapons by American forces, resulting in the outbreak of the plague epidemic in 1966.¹³⁰ Chemical and biological weapons both fall under the category of second-generation weapons of mass

¹²⁹ Ibid

¹³⁰ Robert N. Wesley, "A Review of Jeanne Guillemin. *Biological Weapons: From the Invention of State-Sponsored Programs to Contemporary Bioterrorism*," (New York: Columbia University Press, 2005), p. 25.

destruction. These weapons are referred to as "weapons of poor countries" because they can be produced and manufactured without requiring advanced technologies.

According to the 1969 United Nations definition, biological weapons are defined as various living organisms or contaminated materials derived from such organisms, intended to cause disease or death in humans, animals, or plants, with efficacy dependent on their ability to reproduce. With regard to the means of using biological weapons, air pollution, and terrestrial pollution include the near-surface layer as the main and effective method. In addition, vector insects are used as a means of transmitting disease-causing microbes to people and animals after they have been infected with these microbes.¹³¹

As a result of the great damage that this type of weapon can cause to living organisms and the environment, the international community has moved towards signing special agreements banning these weapons. In 1972, the Convention on the Prohibition of the Development, Stockpiling, and Use of Bacteriological and Chemical Weapons and Their Destruction (BWC) was signed.¹³²

This agreement stands as the first agreement, uniquely designed not primarily for the control of weaponry in this domain but rather to establish a comprehensive framework for safeguarding both humanity and the environment against these lethal weapons, which encompass suffocating, toxic, or analogous substances, as well as bacterial agents.¹³³

The Convention serves as a bulwark for environmental protection by prohibiting the utilization of living organisms as instruments of warfare and shielding them from harm as deliberate targets. Its protective ambit extends to cover environmental preservation during both international and non-international armed conflicts, as well as in peacetime, where it encourages member states to explore potential resource and information exchanges for peaceful purposes.

- **Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction of 1993**

¹³¹ Graham S. Pearson, "The Implementation of Legally Binding Measures to Strengthen the BTWC," in *The Implementation of Legally Binding Measures to Strengthen the Biological and Toxin Weapons Convention*, Springer Netherlands, 2004, pp. 1–6.

¹³² Ibid

¹³³ Saad Allah Omar, *The Development of the Codification of International Humanitarian Law* (Beirut: Dar Al-Gharb Al-Islami, 1997), p. 265

The production and advancement of chemical weapons carry the potential for a global catastrophe, if not lead to the outright destruction of the entire world, the concern about these weapons is particularly heightened given the remarkable advancements in military capabilities. Predicting the extent of damage these weapons could inflict on living organisms has become exceedingly challenging.¹³⁴

Consequently, these weapons have garnered exceptional international attention, resulting in numerous agreements, that including the 1993 convention that prohibits the use, production, and stockpiling of chemical weapons and mandates the disposal of remaining stockpiles held by nations worldwide. This Convention constituted a legal development, as it expanded the scope of the ban on the use of chemical weapons stipulated in the 1925 Protocol to include the prohibition of the development, production, stockpiling, possession, and transfer of chemical weapons, including their delivery systems, and also included the destruction of those weapons.¹³⁵

The Convention defines a toxic chemical as any chemical substance that can cause death, temporary disability, or permanent harm to humans or animals through its chemical effect on vital processes, and this includes all such chemicals, regardless of their origin, method of production, or whether they were produced in facilities, munitions, or elsewhere.¹³⁶ The convention aims to eradicate a full class of weapons of mass destruction. This is achieved by forbidding States Parties from engaging in the development, production, possession, stockpiling, retention, transfer, or utilization of chemical weapons. States Parties are obligated to enforce this prohibition through requisite measures.¹³⁷ Among the Convention's significant obligations, the paramount one is the disposal of chemical weapons, which must be executed in designated facilities with the utmost priority placed on protecting human safety and environmental protection. In addition to the comprehensive prohibition of chemical weapons,

¹³⁴ "Chemical and Biological Weapons," *International Committee of the Red Cross (ICRC)*, Geneva, 2006, <https://www.icrc.org/ar/doc/war-and-law/weapons/chemical-biological-weapons/overview-chemical-biological-weapons.htm>, Accessed 28 June 2023

¹³⁵ Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, opened for signature in Paris on 13 January 1993, entered into force on 29 April 1997, *United Nations Treaty Series*, vol. 1974, p. 45.

¹³⁶ *Ibid.*, Article 2.

¹³⁷ *Ibid.*, Article 1.

the Convention prohibits in its preamble the use of herbicides as a means of war.¹³⁸ As the Convention provides protection for the environment by banning toxic chemicals that harm humans and animals (the living elements of the natural environment), extends the scope of the ban to include herbicides, and also takes into account the environment when destroying these weapons, as it prohibits dumping in water, burial in the ground, or burning in open pits.¹³⁹ Besides the Convention's recognition of environmental protection during both peacetime and wartime, this protection is further fortified by the establishment of a monitoring body responsible for overseeing compliance with the Convention. This organization is called the Organization for the Prohibition of Chemical Weapons, commonly known as the OPCW.¹⁴⁰

○ **Convention on Cluster Munitions**

Due to the significant harm and casualties inflicted on civilians by cluster munitions and their unexploded remnants, numerous nations engaged in negotiations leading to the creation of the Convention on Cluster Munitions. This treaty was adopted at a diplomatic conference hosted in Dublin, Ireland, in 2008 and subsequently came into effect in 2010. It is commonly referred to as the CCM.¹⁴¹

The primary objective of the Convention is to achieve a comprehensive prohibition of cluster munitions. This includes the forbiddance of their use, manufacture, stockpiling, and transfer. Furthermore, the Convention also prohibits States Parties from aiding, promoting, or inciting any individual to engage in any activity that goes against the Convention's stipulations.¹⁴²

The convention established the responsibility of nations to destroy stockpiles of these armaments, in addition to clearing away the remnants of cluster munitions and offering aid and

¹³⁸ Ibid. Preamble (mentioning prohibition of herbicides) and Article I (prohibiting development, production, stockpiling, and use), Article IV (obligations regarding destruction of chemical weapons).

¹³⁹ Convention on Chemical Weapons, Paris, 1993, UNTS vol. 1974, p. 212, Investigation Annex Part IV A, Article 13.

¹⁴⁰ The Organization for the Prohibition of Chemical Weapons is an independent international body specialized in monitoring and following up on the production capabilities of States Parties and their activities to ensure that the objectives of the Treaty are met. The organization is called the abbreviation OPCW, and the name comes from the first letters of the words organization for the prohibition of chemical weapons.

Mission," *Organisation for the Prohibition of Chemical Weapons (OPCW)*, The Hague, No date, <https://www.opcw.org/about-us/mission>, Accessed 28 June 2023

¹⁴¹ Convention on Cluster Munitions, Dublin, 30 May 2008, entered into force 1 August 2010, *United Nations Treaty Series*, vol. 2688, p. 3.

¹⁴² Ibid.

recovery services to the affected individuals. The convention defines cluster munitions as conventional ordnance devised to disperse or release smaller explosive sub-munitions, each weighing less than 20 kilograms, and encompassing these explosive sub-munitions.¹⁴³

As for what is meant by cluster munition remnants, they are failed cluster munitions, abandoned cluster munitions, unexploded sub-munitions, and unexploded bomblets. This agreement has worked to provide protection for the environment from the deadly remnants of these munitions, as it provides protection for the environment in a broad sense. This was evident through the text of Article 7, Paragraph E and Paragraph F,¹⁴⁴ which stipulated that safety and environmental standards should be taken into account when destroying these munitions.

¹⁴³ Ibid.

¹⁴⁴Ibid Article 7, paragraph E, and paragraph F

2.2 Mechanisms of Environmental Protection in International Law

This section reviews the mechanisms of protection provided by international humanitarian law for the environment. The effectiveness and respect for international legal provisions are closely linked to their implementation. Therefore, international humanitarian law includes an integrated implementation mechanism that encompasses prevention and oversight.

However, there remains a gap between the provisions of international humanitarian law and the actual reality of contemporary conflicts and their application. Where, the implementation of these provisions faces difficulties for various reasons, which may be related to the interests of conflicting parties or international failures in pursuing and punishing offenders. Therefore, applying international humanitarian law requires taking measures and means during times of peace and war, and it's not solely about compliance during conflict but also being prepared for it during peacetime. For this reason, the drafters of the Geneva Conventions work to support the implementation of humanitarian rules. The primary responsibility for implementing these conventions rests with the parties, in accordance with the principles of international humanitarian law in general, and with the conflicting parties specifically. Contracting parties play a crucial role in implementing and activating international humanitarian law.

Other channels are also duty-bound to contribute to the respect of this law, such as the protective powers system, the International Committee of the Red Cross, and the International Fact-Finding Commission International humanitarian law offers several possibilities that enable states and organizations to participate in the implementation of international humanitarian law.

2.2.1 The Concept of Preventative Protection for the Environment in International Humanitarian Law

The concept of preventative protection for the environment is defined as the legal measures and actions imposed by international humanitarian law agreements on states and relevant international organizations before the outbreak of armed conflict, with the aim of securing the environment from any potential harm. This concept involves taking proactive and

effective measures to preserve the integrity of the environment before any damage occurs.¹⁴⁵ Among the matters falling under precautionary protection for the environment is the application of specific measures before activating the provisions of international humanitarian law related to environmental protection. These measures aim to ensure the proper and timely implementation of these provisions¹⁴⁶. Notably, preventative protection¹⁴⁷ for the environment, as stipulated by international humanitarian conventions, holds significant importance, as protecting the environment before conflicts arise is better than attempting to rectify damages afterward¹⁴⁸. In general, preventative protection stands as the foundation for conserving the environment and enhancing the sustainability of its resources by preventing potential harm and adverse effects.

By studying the texts of environmental protection agreements, preventative protection can be divided into two main categories. First, there is general preventative protection, and second, specific preventative protection. The distinction between these two types of protection is based on whether the environment is comprehensively covered or specifically targeted. This can be illustrated as follows:

- **General Preventative Protection of the Environment**

The concept of general preventative protection of the environment pertains to those measures and policies based on international humanitarian agreements. The aim is to secure comprehensive protection for the environment in all its dimensions, whether natural or built. Mechanisms for this protection have been categorized according to the responsible entities, including the International Committee of the Red Cross and the states party to international humanitarian agreements. In this context, it could be divided into two categories which are mechanisms of international humanitarian organizations, and national mechanisms.

¹⁴⁵ Al-Dardiri, *ibid.*, p. 238, footnote 4.

¹⁴⁶ Mohammed Sulaiman Al-Dajani, "The Second Arab Course on International Humanitarian Law," report presented by the Jordanian Red Crescent National Society, Amman, 15-24 November 1986, p. 110.

¹⁴⁷ Some refer to them as "prevention and precautionary measures": these are the methods used before the application of the provisions of international humanitarian law in favor of the victims. They are intended to ensure the proper implementation of these provisions when circumstances require their application.

Saeed Salem Jweili, *Implementation of International Humanitarian Law* (Cairo: Dar Al-Nahda Al-Arabiya, 2003), p. 9.

¹⁴⁸ Eve Sandou, "Towards Enforcing International Humanitarian Law," in *Studies in International Humanitarian Law*, Vol. 1 (Cairo: Arab Future House, 2000), p. 509

- The mechanisms of international humanitarian organizations:

The International Committee of the Red Cross (ICRC) takes the lead among humanitarian organizations in its preventive role in protecting victims of armed conflicts, including the environment, due to its historical association with international humanitarian law since its establishment in 1863. The ICRC is distinguished in its implementation of assistance and legal protection tasks, as it engages with victims and parties to conflicts through its delegates, enabling it to draw the attention of relevant authorities¹⁴⁹. Even though the International Committee of the Red Cross (ICRC) is not specialized in environmental matters, its humanitarian role and principles of neutrality, independence, and humanity make it directly interested in protecting the environment during armed conflicts. For this reason, the ICRC has adopted a series of preventative mechanisms to implement and apply the rules of international humanitarian law, including environmental protection.¹⁵⁰ One of these mechanisms is the issuance of guidelines aimed at protecting the environment before the outbreak of armed conflicts. In addition to the issuance of verbal or written memoranda to remind the warring parties of their rights and obligations upon the commencement of military operations. Under no circumstances should the undertaking of these efforts be delayed when information confirming an imminent outbreak of armed conflict becomes evident. The act of reminding the warring parties of the fundamental rules of international humanitarian law by the International Committee of the Red Cross has become a customary procedure, especially in conflicts of an international nature¹⁵¹. Frequently, the memoranda issued by the International Committee of the Red Cross involve reminding the parties to armed conflicts of the principles and rules derived from international humanitarian law. This includes reminders of rules pertaining to the conduct of hostilities and the protection of victims of armed conflicts, including the environment. A notable example of such memoranda is the one issued by the International Committee of the Red Cross on February 30, 1990, to the states party to the 1991 Gulf War, reminding them of

¹⁴⁹ *ibid*

¹⁵⁰ Amer Al-Zamali, "Application of International Humanitarian Law," in *Lectures on International Humanitarian Law* (Cairo: Arab Future House, 2004), p. 126.

¹⁵¹ David Delapra, "The International Committee of the Red Cross and International Humanitarian Law," in *Studies in International Humanitarian Law*, Vol. 1 (Cairo: Arab Future House, 2000), pp. 393–394.

the Geneva Conventions. This memorandum was appended to the memorandum dated December 14, 1990, on the same subject¹⁵².

another preventive mechanism undertaken by the International Committee of the Red Cross is Issuing guidelines specific to handbooks and military instructions regarding the protection of the environment during times of armed conflict, It has exerted efforts to enhance the protection of the natural environment during armed conflicts. This effort was manifested through a specific proposal developed by the International Committee following consultations conducted by a team of international experts. This proposal was presented to the United Nations under the title: "Guiding Principles for the Inclusion of Environmental Protection in the Military Manuals and Instructions During Armed Conflicts". Although the United Nations General Assembly did not formally announce its official approval of these guiding principles during its forty-ninth session, it called upon all states to duly consider the possibility of incorporating them into their military manuals and instructions directed at their military personnel¹⁵³.

The guiding principles aim to facilitate the education and training of armed forces concerning environmental protection, an often overlooked aspect of international humanitarian law. They encapsulate the pertinent international rules that armed forces personnel must comprehend and uphold. These principles should not be misconstrued as a novel attempt at legislation; rather, they serve as a means to raise awareness about the significance of safeguarding the environment during armed conflicts. Notably, these principles distinctly and effectively contribute to enhancing the respect for and protection of the natural environment, even amidst the circumstances of combat¹⁵⁴.

Undoubtedly, these guiding principles unquestionably constitute mechanisms of general preventative protection for both natural and constructed environments.

The significance and distinction of the International Committee of the Red Cross's efforts in promoting awareness of international humanitarian law are beyond comparison. Where the Committee diligently works to develop and implement the rules of this law in accordance with

¹⁵² Ibid, p. 405.

¹⁵³Hans-Peter Gasser, "Follow-Up to the International Conference on the Protection of War Victims 1993, Guidelines for the Preparation of Military Manuals and Instructions on the Protection of the Environment in Armed Conflicts," *International Committee of the Red Cross*, Geneva, n.d., <https://www.icrc.org>, accessed 28 June 2023

¹⁵⁴ Ibid

its foundational principles. Its mechanisms for convening meetings are among the prominent preventive tools for protecting the environment during times of peace.

In April 1992¹⁵⁵, the International Committee organized an expert meeting in Geneva to explore the challenges of environmental protection during armed conflicts. During this meeting, experts emphasized the importance and utility of existing rules, whether they stem from treaty law or traditional principles of international humanitarian law, as well as rules derived from the principles of general international law governing state responsibility toward the environment. The experts praised the effectiveness of environmental protection through knowledge and compliance with these rules, underlining the necessity of disseminating this awareness widely during periods of peace. They particularly suggested the use of dedicated awareness handbooks for armed forces personnel as a means to achieve this goal¹⁵⁶. In January 1993, the International Committee of the Red Cross organized a conference of experts in Geneva to discuss environmental protection during armed conflicts. The experts underscored the significance of preserving the environment during combat and directing attention toward the common interest. The conference addressed multifaceted aspects, such as striking a balance between environmental preservation and military operational needs. The conference yielded proposals to ensure environmental protection during armed conflicts, based on contemporary concepts of international responsibility¹⁵⁷.

¹⁵⁵ The meeting brought together approximately thirty experts from the armed forces, academic institutions, governments, and the scientific community, as well as representatives from governmental and non-governmental organizations. All participants were invited in their personal capacities. The objectives of the meeting were as follows:

1. To identify the content of the current law.
2. To pinpoint the main issues arising in the implementation of this law.
3. To identify any gaps in the current law.
4. Identifying the necessary measures in this field, and based on the report issued from this meeting, the General Assembly adopted Resolution 47/37 on November 25, 1992. Through this resolution, the General Assembly emphasized the importance of provisions of international law that apply to the protection of the environment during armed conflicts. It expressed concern about the environmental damage caused by conflicts that had recently occurred. Furthermore, it reaffirmed that the deliberate destruction of the environment, not justified by military necessity and carried out intentionally, is contrary to the provisions of international law.

Wafi Hajj, "Non-Governmental Organizations and Their Role in Environmental Protection," *Journal of Generation of Political Studies and International Relations*, vol. 1, January 2015, pp. 78–87, p. 78

43. ¹⁵⁶ Antoine Bouvier, "Recent Studies on the Protection of the Environment in Time of Armed Conflict," *International Review of the Red Cross*, no. 291, November–December 1992, thirty-second year, pp. 557–578, p. 557.

¹⁵⁷Ibid, p. 55.

○ National Mechanisms:

It has become of utmost necessity to implement international humanitarian law at the national level, in accordance with Article 26 of the Vienna Convention on the Law of Treaties¹⁵⁸. Respect for the law cannot occur automatically; it requires explicit national efforts to implement and support necessary measures. International humanitarian law provisions encompass numerous measures that states must undertake in all areas of international humanitarian law. Among these national measures related to the implementation of international humanitarian law, we can shed light on the following points:

States respect the law; The best assurance for the application of international humanitarian law lies in states' adherence to the principle of *pacta sunt servanda* – upholding their treaty commitments. When states become parties to the Geneva Conventions and its additional protocols, they commit to ensuring the respect and implementation of these conventions. This commitment includes respecting international humanitarian law and ensuring its respect by others. It encompasses the common Article 1 of the Geneva Conventions¹⁵⁹ and also the Article 1 of the First Additional Protocol¹⁶⁰. Therefore, it is incumbent upon state parties to take necessary measures to fulfill their obligations in the implementation of humanitarian law¹⁶¹. These provisions emphasize the binding nature of treaties and the commitment of parties to uphold and ensure their respect in all circumstances, illustrating the fundamental principle of good faith in treaty implementation. While the application of international humanitarian law at the national level is founded on legal principles, the common Article 1 of the Geneva Conventions imparts a distinctive character to the obligations. These obligations bring a comprehensiveness that manifests in "the obligation to respect" and "the obligation to ensure

¹⁵⁸ *Vienna Convention on the Law of Treaties*, 23 May 1969, entered into force 27 January 1980, *United Nations Treaty Series*, vol. 1155, p. 331, Article. 26

¹⁵⁹ *Geneva Conventions of 12 August 1949*, The common Article 1 "The High Contracting Parties undertake to respect and to ensure respect for the present Convention in all circumstances."

¹⁶⁰ *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 3, Article. 1

¹⁶¹ Mohammed Fahad Al-Shalladeh, *International Humanitarian Law* (Amman: Dar Al-Thaqafa for Publishing and Distribution, 2005), pp. 310–311.

respect." The commitment to respect necessitates that states exert their utmost efforts to ensure the observance of the laws related to international humanitarian law by their individuals and institutions. Conversely, the commitment to ensure respect requires states to take all necessary measures to guarantee compliance with the laws by individuals and relevant entities, particularly in times of conflict¹⁶².

The implementation of the commitment to adhere to international humanitarian law entails the adoption of necessary legislative and regulatory measures for its application and enforcement. This also encompasses the exchange of these measures among the contracting parties. These measures encompass all legal actions, whether emanating from the legislative authority or the relevant executive authority responsible for the implementation of the Geneva Conventions and their Additional Protocols, as well as any other relevant documents pertaining to international humanitarian law¹⁶³. Article 80 of the Additional Protocol I of 1977 reaffirmed the means through which states can undertake the implementation of their obligations under the Conventions and Protocol. These means encompass:

Contracting states and parties to the conflict must promptly take all necessary measures to implement their obligations under the Conventions and Protocol.

Contracting states must issue orders and instructions as necessary to ensure the respect of the Conventions and Protocol, and effectively carry them out.

The text did not specify particular procedures or mechanisms but rather left it to the states to select means and mechanisms for implementing the observance of international humanitarian law according to their discretion.

Dissemination of the rules of international humanitarian law; it is a crucial means of implementing and enforcing this law at the national level. This dissemination involves informing everyone about the principles of this law and raising awareness among them. Ignorance of and disregard for humanitarian law pose a significant danger, as violations of it can lead to human suffering and loss of life¹⁶⁴. The matter of dissemination is an obligatory commitment rather than optional. The dissemination of international humanitarian law and

¹⁶² Saeed Salem Jweili, *Implementation of International Humanitarian Law* (Cairo: Dar Al-Nahda Al-Arabiya, 2003), pp. 11–112

¹⁶³ Ibid.

¹⁶⁴ Mohammed Yousif Al-Alwan, "Dissemination of International Humanitarian Law," in *Studies in International Humanitarian Law*, vol. 1 (Beirut: Arab Future House, 2000), pp. 487–496, p. 487

raising awareness about it is considered one of the most important mechanisms mandated by international agreements, as reaffirmed by a series of international resolutions. This dissemination aims to enhance the prevention of grave violations and achieve optimal implementation of the provisions of international humanitarian law at the national level¹⁶⁵. The commitment to dissemination is firmly established in the Geneva Conventions of 1949 and in the First Additional Protocol of 1977. In this context, the Common Articles (Articles 47, 48, 127, 144) of the Geneva Conventions emphasize the necessity for High Contracting Parties to widely disseminate the texts of these conventions within their territories, both in times of peace and war. They also commit to incorporating the study of these texts into military and civilian educational programs whenever possible, ensuring that the principles they contain are known to all populations, especially to armed forces personnel, medical personnel, and religious personnel.

The First Additional Protocol of 1977 also reaffirms this commitment. The first paragraph of Article 83 stipulates that High Contracting Parties are obligated to widely disseminate the texts of the conventions and the protocol within their territories, encouraging civilian populations to study these texts, and particularly incorporating them into military education programs. This ensures that these legal instruments are well-known to both armed forces and civilian populations. Moreover, the United Nations General Assembly has repeatedly emphasized the importance of states committing to the dissemination of international humanitarian law during armed conflicts through multiple resolutions. In its 27th session in 1972, Resolution 3032 was adopted in this regard. Similarly, during its 28th session in 1973, Resolution 3102 was passed. Additionally, in 1977, the General Assembly issued Resolution 44/32, reaffirming this concept.¹⁶⁶ Dissemination of international humanitarian law should encompass all relevant parties, including armed forces and civilian populations which is crucial to ensuring its respect and minimizing the occurrence of violations.

Exchange of Translations of International Texts on Environmental Protection During Armed Conflicts (Translation of Agreements into National Languages); translating agreements and legal texts into national languages and local dialects is an important precautionary measure.

¹⁶⁵ Omar Ahmed Makki, *Mechanisms for Implementing International Humanitarian Law and Human Rights During Conflicts* (Riyadh: [Publisher not specified], 2012), p. 23.

¹⁶⁶ Ibid.

It contributes to avoiding or minimizing errors and reducing variations in the interpretation of provisions of international humanitarian law agreements. This helps prevent negative outcomes during armed conflicts. Translation is a fundamental factor in fulfilling obligations and facilitating dissemination and education efforts. This mechanism is part of the general preventative measures for environmental protection outlined in Articles (48, 49, 128, 145) of the 1949 Geneva Conventions. It has been further strengthened in Article 84 of the Additional Protocol I of 1977¹⁶⁷. These articles stipulate that States parties are obligated to exchange official translations of the texts of the 1949 Geneva Conventions (in English, French, Russian, and Spanish) and the texts of the Additional Protocols of 1977 (in Arabic, Chinese, English, French, Russian, and Spanish)¹⁶⁸. This step aims to enhance communication and understanding of humanitarian laws applied to the environment during armed conflicts, ensuring their effective and accurate implementation. Article 28 of the 1977 Second Additional Protocol¹⁶⁹ adds to this context, obligating states parties to exchange official translations of this Protocol and any laws or regulations they might issue to ensure its implementation. This exchange is facilitated by the depositary authority for the agreements, the Swiss Federal Council, or by protecting states¹⁷⁰. This requirement for state parties to exchange translated texts serves as a key measure in providing preventative protection for the categories covered by these agreements. These include the environment affected by ongoing combat, and civilians not directly involved in military activities. Thus, international provisions mandating the exchange of translated agreement texts

¹⁶⁷ "The High Contracting Parties shall exchange official translations of this Protocol and of the laws and regulations which they may issue to ensure the application thereof, as soon as possible, through the depositary, the Secretariat of the United Nations, or through the Protecting Powers, as appropriate."

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 3, Art. 84

¹⁶⁸ "The original of this Protocol shall be deposited with the Depositary of the Conventions and the Depositary shall transmit certified true copies thereof to all the Parties to the Conventions. The Arabic, Chinese, English, French, Russian, and Spanish texts shall be equally authentic."

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), *ibid.*, Art. 102

¹⁶⁹ The Arabic language has become one of the official languages of the Additional Protocols of 1977, whereas it was not the case for the Geneva Conventions of 1949. This is one of the advantages attributed to the Additional Protocols of 1977, which resulted from significant participation by Arab states.

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 3

¹⁷⁰ *Ibid.*

during peacetime, and before armed conflicts arise, constitute a significant preventative mechanism for environmental protection.¹⁷¹

Training Qualified Personnel to Ensure Environmental Protection in Armed Conflicts; The concept of training qualified personnel to ensure environmental protection in the event of armed conflicts is a relatively recent idea, first appearing in international humanitarian law in the 1977 First Additional Protocol, Article 6¹⁷². This reference was based on a decision from the 1965 International Conference of the Red Cross and Red Crescent, which called for the formation of a group of individuals qualified to work in the field of implementing international humanitarian law. This decision was derived from a recommendation by the Legal Medical Committee of the Principality of Monaco to establish a group of qualified individuals in each country to oversee the implementation of the mentioned law.

Although Article 6 of the First Protocol did not precisely define the nature of qualified individuals, qualified personnel can include relief workers, government officials, and military personnel. This encompasses individuals capable of providing support and coordination for the implementation of international humanitarian law, particularly concerning environmental protection during armed conflicts. This mechanism also helps draw the attention of government authorities to the necessity of adopting or amending national legislation to be in line with the requirements of international humanitarian law and domestic law, ensuring effective environmental protection during armed conflicts¹⁷³.

Issuing Military Instructions and Manuals to Ensure Respect for Environmental Protection Rules in Armed Conflicts; International humanitarian law contains numerous rules and principles that armed forces must adhere to during armed conflicts, including environmental protection and avoiding widespread environmental damage. To ensure compliance with these

¹⁷¹ Sandou, *ibid.*, footnote 149, p. 517.

¹⁷² Article 6 of the First Additional Protocol of 1977 stipulates the following:

- The High Contracting Parties endeavor in times of peace, with the assistance of National Red Cross (Red Crescent, Red Lion and Sun) Societies, to prepare qualified personnel to facilitate the application of the Conventions and this Protocol, particularly in relation to the activities of protecting powers.
- The formation and training of such personnel is essentially a matter for national discretion
- The International Committee of the Red Cross shall place at the disposal of the High Contracting Parties lists of persons who have been prepared as mentioned above, drawn up by the High Contracting Parties and transmitted to the Committee for this purpose.
- The use of such personnel outside national territory shall in each case be the subject of special agreements between the interested Parties.

¹⁷³ *Ibid.*

rules, it is necessary to issue military instructions and manuals that guide military personnel in adhering to environmental protection rules during armed conflicts¹⁷⁴.

The issuance of guidance manuals as part of military training programs is an effective means to educate and train armed forces on complying with the provisions of international humanitarian law and protecting the environment during armed conflicts. This training includes instructions regarding distinguishing between civilian and military targets, preserving the environment during military operations, and preventing unprecedented pollution of water sources and the environment. Many countries have highlighted and incorporated environmental protection in their military manuals and training exercises, either by adopting the principle of distinction between targets or by avoiding the destruction of environmental property during military operations. These efforts contribute to enhancing compliance with environmental protection and humanitarian rules during armed conflicts and reducing negative environmental impact¹⁷⁵.

Duties of Commanders; The responsibilities of military commanders extend beyond merely monitoring the enforcement of the law and suppressing violations. According to Article 87, paragraph 2, of the Protocol, "High Contracting Parties and Parties to the conflict shall require military commanders - at all levels of responsibility - to ensure that members of the armed forces under their command are aware of their obligations under the Conventions and this Protocol, and that they are able to comply with them, and to prevent and suppress violations." Therefore, if leaders who hold authority are uninformed about the law and, in ignorance, commit acts that violate its provisions, their superiors, including officers, bear responsibility for those actions¹⁷⁶.

It appears clearly that international law has established preventive environmental protection mechanisms as an integral part of its treaties and agreements. Under these mechanisms, countries are required to take measures to prevent potential damage to the environment resulting from their actions, and to abide by the rules for minimizing the environmental impact of any activity they undertake. This is directly related to Israel's violations

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ Ibid.

of the environment in the Gaza Strip, as many of the actions and activities carried out by Israel in the region led to environmental pollution and negatively affected the public health and safety of civilians. In this context, commitment to preventive environmental protection mechanisms in international law can be linked to the investigation of violations committed by Israel, which severely damaged the environment and civilians in the Gaza Strip. Based on these mechanisms, issues related to environmental protection in the Gaza Strip can be submitted to the competent international organizations and bodies for review and to take the necessary measures to implement the principles of international justice and responsibility in this context.

3. The Legal Responsibility Related to The Violation of Environmental Protection Rules in International Law in The Gaza Strip

Protection regulations outlined in international humanitarian law within the Gaza Strip constitute a significant subject that highlights the dilemmas facing international law and the international community as a whole. This reflects the shared commitments of member nations to protect the environment and mitigate the adverse repercussions of armed conflicts, presenting international responsibility as a concept rooted in both legal and ethical principles.

In this context, Israel's actions in the Gaza Strip bring into focus the question of international accountability for disregarding the environmental protection provisions of international humanitarian law. It is assumed that states are duty-bound to refrain from causing environmental harm and bear the responsibility for shielding the environment and the well-being of civilians during times of armed conflict.

Consequently, due to Israel's infringements of environmental protection regulations in the Gaza Strip, these transgressions can be presented to the International Court of Justice, international organizations, and legal entities for consideration regarding international accountability and the implementation of appropriate measures, thereby activating the principles of international justice and responsibility in this particular context.

3.1 The Concept of International Responsibility

International responsibility is a fundamental concept in the field of international law, embodying the accountability of states and other international actors for their actions or omissions that contravene established international norms, principles, or treaties.¹⁷⁷ This concept serves as the cornerstone for upholding order, justice, and fairness in the international arena. It is commonly utilized by jurists to refer to the system by which states are held accountable for their illegal actions against other states and peoples based on the provisions of international law that require them to acknowledge their violation and the necessity of rectifying

¹⁷⁷ J. Crawford and S. Olleson, *The Nature and Forms of International Responsibility*, *International Law* (Geneva: [Publisher not specified], 2003), p. 447.

it. However, different jurists have come to different conclusions about what exactly constitutes international responsibility.¹⁷⁸

The French jurist Charles Rousseau defined it as a legal system according to which the country charged with committing an illegal act in accordance with international law is obligated to compensate the country against which this act was committed.¹⁷⁹

US Judge Elliot Richardson Anderson characterized it as "The obligation of states to refrain from using force in resolving international disputes and to avoid interfering in the internal affairs of other states in the face of the United Nations and the entire international community."¹⁸⁰

British Judge James Crowley offered another interpretation, defining international responsibility as "the responsibility of states, towards the international community as a whole, to abstain from actions that infringe upon the rights of other states and to assume the duty of providing restitution for any harm caused in the event of a breach of this responsibility."¹⁸¹

Dr. Al-Sayed Abu Eita articulated it as the process of attributing an action to an individual recognized in international law, regardless of whether the action is proscribed by international law, as long as it may lead to harm to an individual under international law. This necessitates the imposition of a specific international penalty, whether punitive or non-punitive in nature.¹⁸²

This definition can be viewed as the most precise, as it encompasses both civil and criminal liability, whether arising from an act that constitutes a violation of international norms or a lawful action resulting in harm. Additionally, the definition encompasses the consequence of international responsibility, which involves the obligation for sanctions, whether of a criminal or civil nature.

¹⁷⁸ Hisham Qawasmiya, *International Criminal Responsibility of Presidents and Military Commanders*, 1st ed. (Mansoura: Dar Al-Fikr and Law, 2011), p. 25.

¹⁷⁹ L. Preuss, "The Relation of International Law to Internal Law in the French Constitutional System," *American Journal of International Law*, vol. 44, no. 4, 1950, pp. 641–660, p. 641

¹⁸⁰ P. J. Kuijper and E. Paasivirta, *Further Exploring International Responsibility: The European Community and the ILC's Project on Responsibility of International Organizations* (New York: [Publisher not specified], 2004), p. 25

¹⁸¹ Ibid.

¹⁸² Al-Sayed Abu Aita, *International Sanctions between Theory and Practice* (Alexandria: University Education Foundation, 2004), p. 249

In essence, the concept of international responsibility underscores the shared responsibility of all nations to adhere to international laws and standards, fostering a more just and orderly world where states are answerable for their conduct on the international stage.¹⁸³

Accordingly, international responsibility for violating the environment during armed conflicts is defined as a violation by a person of international law of the obligations of international conventions and norms within the framework of international humanitarian law devoted to protecting the environment during armed conflicts.

3.1.1 Theories of International Responsibility:

International responsibility in international law is based on three basic theories, which are the theory of error, the theory of illegal international action, and the theory of risks.

The theory of error as a basis for international responsibility:

This theory serves as the initial basis for international responsibility. According to this theory, states are held accountable only if they commit an error. This error manifests when a state engages in actions with the intention of harming another country or its citizens. Errors can take various forms, such as negligence by the state before the occurrence of actions leading to harm due to a failure to take necessary preventive measures.¹⁸⁴ It can also involve negligence after such actions have taken place, involving the failure to track down and penalize the perpetrators. In both scenarios, the state is deemed to have committed a detrimental error and omission that necessitates its accountability, regardless of whether the error was made in good or bad faith. In essence, errors can take the form of default, deception, or negligence.¹⁸⁵

Despite the importance of this theory, it does not solve the problem when the state performs a legitimate act and it is not a violation of any legal rule of international and humanitarian law that results in causing harm to another country. Furthermore, given the advancements in science and technology, it has become increasingly challenging to establish errors in cases of environmental damage. This complexity arises from the profound alterations

¹⁸³ Ibid.

¹⁸⁴ Hussein Jamil, *International Responsibility for Violating the Protection of Journalists and Media during Armed Conflicts in Light of International Law* (Egypt: Dar Al-Kutub Al-Lawiya, 2012), p. 175.

¹⁸⁵ Ahmed Abdul Karim Salama, *The Environmental Protection Law, a Fundamental Study in National Regulations and the Convention*, 1st ed. (Riyadh: Scientific Publishing and Press - King Saud University, 1997), p. 453

that can affect the entity responsible for the harm or the prolonged latency period between the harmful incident and the manifestation of damage, as observed in instances of nuclear contamination or the disposal of toxic or radioactive waste. Such circumstances can make it arduous to pinpoint the exact source of pollution, thus complicating the attribution of fault to an individual or entity. likewise, it can be extremely difficult to prove that an individual intentionally made an error or was careless, particularly when it is claimed that they failed to perform their assigned duties.¹⁸⁶ In addition, the research on the standard of behavior adopted by states when committing an act that harms the safety of the environment does not agree with the nature of the state as a legal person, just as the error theory is a psychological theory that is difficult to prove against the state as a legal person. Accordingly, it is not possible to rely on the error theory as a basis for establishing international responsibility for the violation of environmental protection during armed conflicts.¹⁸⁷

Theory of internationally wrongful work as a basis for international responsibility:

According to this theory, a state incurs international responsibility as soon as it commits an act that violates international law, whether intentionally or due to negligence. Whether the act in question violates a treaty provision or customary law, international responsibility takes place as long as it has developed into a source of public international law and creates an international obligation for the state. Additionally, it's important to emphasize that the legality of the act is determined by international law, not domestic law. The act might be lawful under a state's domestic law but illegal at the international level.¹⁸⁸ According to the prevailing perspective, the mere existence of the wrongful act, which contravenes the law and is attributed to a subject of international law, results in the responsibility of that international legal entity without the necessity of actual harm. In this theory, damage is not a prerequisite for responsibility; rather, the sole basis for international responsibility is the violation of international legal norms. This theory closely aligns with the contemporary international reality and thus garners significant attention in international jurisprudence, the rulings of international

¹⁸⁶ Ibid.

¹⁸⁷ Muammar Rateeb Muhammad Abdel Hafez, *International Responsibility for the Transport and Storage of Hazardous Waste*, in *Hazardous Waste between the Hammer of Corruption and the Anvil of Globalization* (Cairo: Dar Al Nahda Al Arabiya, 2007), p. 316

¹⁸⁸ Ibid.

tribunals, especially the International Court of Justice, and the opinions of state representatives during international law codification conferences.¹⁸⁹

However, it's worth noting that this theory is often criticized for being overly expansive. It places responsibility on the victim without considering the state's fault, which may not entirely align with the prevailing perspective in the international community, where states are held responsible for their errors.

Risk theory as a basis for international responsibility:

While traditional international jurisprudence and practices have relied on the theory of wrongful acts as the foundation for international responsibility, a new perspective has emerged within international law jurisprudence. This perspective suggests the possibility of international responsibility when a state engages in an exceptionally grave act that results in harm to another state, even if the act itself is considered lawful at the international level.¹⁹⁰ Advocates of this theory point to examples of such exceptionally grave lawful acts, including atomic activities, flight operations like rocket and satellite launches, space exploration, and marine and aerial pollution resulting from offshore oil exploration and extraction. The theory of risk has gained significant acceptance within international jurisprudence, particularly regarding lawful activities of exceptional gravity. According to this theory, a state can be held responsible solely for causing harm to others, even if it did not commit an error, act negligently, or engage in wrongful conduct. Even when the state is involved in legitimate activities but of a particularly grave nature, it may bear responsibility if it causes harm to another legal entity.¹⁹¹ International jurisprudence has largely agreed to limit the application of the theory of risk to grave activities conducted under international agreements.¹⁹²

However, considering the current situation of international relations and the significant scientific and technological advancements occurring worldwide, neither of these theories can universally serve as the sole basis for international responsibility.

¹⁸⁹ Samir Muhammad Fadel, *International Responsibility for Damage Resulting from the Use of Nuclear Energy in Peacetime* (Cairo: Alam al-Kutub, 1976), p. 130

¹⁹⁰ Mohsen Evkeren, *International Environmental Law*, 1st ed. (Cairo: Dar Al-Nahda Al-Arabiya, 2006), p. 157.

¹⁹¹ Ibid.

¹⁹² Amjad Heikal, *International Individual Criminal Responsibility before International Criminal Justice, a Study within the Framework of International Humanitarian Law* (Cairo: Dar Al-Nahda Al-Arabiya, 2008), p. 76.

All of these theories play an important role in international environmental law during armed conflicts because based on these theories, international responsibility can be imposed on the aggressor state. However, among these theories, the Unlawful International Act theory is the most appropriate for international environmental law during Armed conflicts.

This is because international environmental law is concerned with protecting the environment and natural resources in situations of armed conflict. In general, actions that lead to environmental pollution or the destruction of natural resources in situations of armed conflict are considered international wrongful acts.

Under this theory, states can be held liable for environmental pollution resulting from their actions during armed conflicts. Therefore, states may have to bear responsibility and compensate for the environmental damage they have caused.

The theory of error is based on proving the error, whether intentional or unintentional, for the occurrence of responsibility, and it is not sufficient to breach an international obligation. Risk theory is relatively modern, in which responsibility is based on risks. A harmful act, even if it is legitimate, entails responsibility, and what is related to the environment is envisioned in risk theory, which is broader in the field of responsibility.

3.1.2 Conditions for international responsibility for environmental damage:

International humanitarian law has recognized the accountability of parties to an armed conflict in the event of a violation of a humanitarian rule stipulated in this law, by holding the international person who violates this rule responsible under certain conditions.¹⁹³

The conditions for the establishment of international responsibility for environmental damage constitute crucial aspects within the framework of international humanitarian law.¹⁹⁴ These

¹⁹³ Humanitarian texts allowed the parties to the conflict to be held criminally accountable for the acts committed by members of their armed forces during the armed conflict, in addition to the civil liability for compensation for damages, as Article 3 of the Fourth Hague Convention of 1907 stipulated that “a belligerent who violates the provisions of the aforementioned regulation shall be obligated to compensate if the need arises, just as shall be responsible for all acts committed by persons belonging to its armed forces”

Hague Convention (IV) Respecting the Laws and Customs of War on Land, 18 October 1907, entered into force 26 January 1910, *United Nations Treaty Series*, vol. 205, p. 277, Art. 3;

¹⁹⁴ Article 91 of Protocol I of 1977 states that “a party to the conflict that violates the provisions of the Conventions or this Annex shall be liable to pay compensation if the case so requires, and shall be responsible for all acts committed by it.” Persons forming part of his armed forces.

conditions encompass a set of criteria and requirements that must be met to confirm the legal subordination and accountability of states for the environmental harm they cause in situations of armed conflicts and exceptional circumstances, as follows:

- A. The existence of a legal rule that protects the environment and the occurrence of a violation of this rule:

When comparing different legal systems, it becomes clear that each one requires the existence of a legal rule, whether it be written or customary, in order to apply legal sanctions on individuals who violate legal rules and norms. This is referred to as the "legal basis for a crime," and it is recognized as a fundamental tenet of criminalization and punishment in all legal systems. As a result, there must be a legal regulation within international humanitarian law that makes environmental attacks illegal, based on the fundamental tenet that "No crime and no punishment without a legal text." As a result, a legal text is necessary to identify the criminal act and determine who is responsible for it. The protection of the environment during armed conflicts is explicitly mentioned in several legal texts in international humanitarian law, as well as causing extensive, long-term, and extremely dangerous damage to the natural environment is a war crime, which is one of the crimes included in the Statute of the International Criminal Court.¹⁹⁵ Also, the protection of the natural environment during armed conflicts is one of the rules of customary international humanitarian law, as indicated by the International Committee of the Red Cross.¹⁹⁶ For international responsibility to be established, a violation must occur, involving an act that contravenes the legal principles of international humanitarian law safeguarding the environment. This act can be internationally unlawful or even lawful but causing harm to any individual under international law. Some refer to this as the objective element of international responsibility, and this act may constitute an international crime, such as grave breaches of the rules of international humanitarian law.¹⁹⁷ The prevailing scenario for

Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, entered into force 7 December 1978. *United Nations Treaty Series*, vol. 1125, p. 3, Art. 91.

¹⁹⁵ *Rome Statute of the International Criminal Court*, 17 July 1998, entered into force 1 July 2002, *United Nations Treaty Series*, vol. 2187, p. 397, Art. 5. Available at: <https://www.icc-cpi.int/sites/default/files/RS-Eng.pdf>

¹⁹⁶ John Mary Henkarts et al., *Customary International Humanitarian Law*, vol. 1 (Cairo: Cambridge University Press – International Committee of the Red Cross, 2007), p. 127.

¹⁹⁷ Ahmed Abu Al-Wafa, "Conditions of International Responsibility," *The Diplomat Magazine*, No. 13, Saudi Arabia: Institute of Diplomatic Studies, 2000, pp. 45–47

a violation or act establishing international responsibility is an unlawful act, which refers to actions that contradict or are not in line with the principles of public international law, issued by legal subjects of this law, whether they are states, international organizations, or even persons. The act may be lawful but causes harm to others, in which case the lawful act becomes the basis for international responsibility, and then states are held accountable under the theory of risks.¹⁹⁸

B. Occurs environmental harm:

The establishment of international responsibility goes beyond a mere violation of international legal obligations by a legal subject under international law. It necessitates that such a violation results in harm to another legal subject of international law. In essence, harm is a fundamental condition for the realization of international responsibility and represents the second pillar of the requirements for international responsibility. Harm acts as the initial cornerstone that triggers consideration for invoking international responsibility.¹⁹⁹ Harm, in the context of international responsibility, refers to the infringement upon a legitimate interest or right of an entity governed by public international law. Environmental harm, in general terms, involves interference, damage, or subsequent alteration to the environment, which can be either material or moral. It is imperative that the harm be actual, signifying a genuine infringement upon the rights of the state complaining of such harm.²⁰⁰

Furthermore, environmental harm is subject to specific criteria, including:

- Environmental harm must be substantial, potentially leading to health issues for civilian populations.
- It should have a wide-reaching impact, extending over several kilometers.
- Environmental harm should be of a long-term nature, persisting for several months or across different seasons of the year.²⁰¹

C. Availability of a causal relationship:

Both jurisprudence and judiciary in various legal systems concur that the mere occurrence of harm is not sufficient for international responsibility to arise. Rather, it is essential

¹⁹⁸ Ibid.

¹⁹⁹ Ibid.

²⁰⁰ Abdel Hafez, *ibid.*, footnote 74, p. 424.

²⁰¹ Ibid.

that there exists a causal connection between the wrongful act and the resulting harm, signifying the link between the cause and the causative. A tangible causality must be established between the action and the harm, not interrupted by any other intervening factor.²⁰² The harm should be a normal, natural, or necessary consequence that unavoidably follows from the action. It is not logically acceptable to hold an individual accountable for a negative outcome that followed their conduct unless the conduct itself is the cause of its occurrence.²⁰³

This causal relationship pertains to two entities within the realm of international law. Claims for international responsibility must exist between two equivalent legal entities, both of which are subjects of international law. In most cases, the international legal person is a state, and an act is deemed attributable to the state if it originates from any of its public authorities.²⁰⁴

D. Availability of criminal intent:

Criminal intent is considered one of the essential elements for the establishment of criminal responsibility. However, civil responsibility within international humanitarian law, arises merely upon the violation of the environmental protection rules by the parties to a conflict, resulting in harm. Regardless of the presence or absence of criminal intent, conflict parties can be held accountable for environmental harm caused by the use of military means and methods, even if they did not have the criminal intent to inflict such harm.²⁰⁵ It suffices that a party to the conflict anticipates or could anticipate that the use of such means and methods of warfare will result in significant environmental harm.²⁰⁶

This understanding of the term international responsibility opens the way for Israel to be held accountable for the grave environmental violations it committed in the Gaza Strip. Based on the established criteria for establishing international responsibility for environmental violations outlined above, it becomes apparent that all these conditions are applicable to the environmental violations committed by Israel in the Gaza Strip. Consequently, Israel incurs legal repercussions as follows:

²⁰² Najat Ahmed Ibrahim, *International Responsibility for Violations of the Rules of International Humanitarian Law* (Alexandria: Mansha'at Al-Ma'arif, 2009), p. 140.

²⁰³ Ibid.

²⁰⁴ Ibid.

²⁰⁵ Ibid.

²⁰⁶ *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 3, Arts. 35, 55

Firstly, the principle of causality is upheld, as the actions of the Israeli occupation, including the use of prohibited weapons and the deliberate targeting of critical infrastructure, have led to severe environmental damage in the region. The cause-and-effect relationship between these actions and the resulting harm to the environment is undeniable.

Secondly, Israel's violation of well-established principles of international humanitarian law, such as the duty to protect civilian populations and civilian objects, is a clear breach. The deliberate targeting of environmental resources, including water and sanitation facilities, constitutes a violation of these legal obligations.

Thirdly, Israel's actions in the Gaza Strip have had a significant and lasting impact on the natural environment, causing harm that extends beyond the immediate hostilities. This prolonged damage includes contamination of soil and water sources, as well as damage to agricultural lands and ecosystems.

Lastly, Israel's conduct has drawn international condemnation and attention, with various reports and assessments confirming the environmental devastation caused by its actions. This underscores the international community's recognition of the gravity of the situation and the need for accountability. In light of these considerations, it is evident that Israel bears international responsibility for its environmental violations in the Gaza Strip, with potential legal and moral obligations towards addressing and mitigating the environmental harm caused."

3.2 The legal implications of the Israeli occupation, and the legal implications on states and third parties

The international legal ramifications stemming from Israel's environmental violations in the Gaza Strip carry significant implications for both Israel itself and third-party states involved in related agreements. These violations have raised pressing questions regarding accountability, reparations, and the enforcement of international humanitarian and environmental law. As the environmental degradation in Gaza continues to worsen due to Israel's violations, the legal responsibilities and consequences at the international level have become increasingly prominent. This section will delve deeper into the multifaceted legal consequences, including potential actions against Israel, obligations under international treaties, and the broader international community's role in addressing these environmental violations.

3.2.1 The legal implications of the Israeli occupation:

Israel has legal consequences within the scope of international law that are evident in the context of civil liability and criminal liability as follows:

- **Civil liability**

Civil liability within the scope of international humanitarian law was established under Article 3 of the Fourth Hague Convention of 1907²⁰⁷ and Article 91 of the First Additional Protocol of 1977.²⁰⁸ These articles stipulate the responsibility of parties to a conflict in case of violations of international treaty provisions, requiring compensation if circumstances necessitate it. Articles 35 to 55 of the same Protocol specify environmental damage as a condition for establishing civil liability.²⁰⁹ It is important to note that these articles refer to compensation as one of the legal consequences of civil liability. However, civil liability extends beyond mere compensation; it can encompass claims for the restoration of environmental damage, the cessation of harm, and the return of the environment to its original state, where feasible. Therefore, the term "compensation" includes the repair of environmental damage and its restoration to its original state, as well as the inherent concept of ceasing the actions causing harm.²¹⁰

Consequently, there are multiple forms of compensation under international law resulting from Israel's environmental violations in Gaza, including:

Cessation of Unlawful International Acts:

This consequence is related to continuous unlawful acts with ongoing effects. It implies that the continuation of environmental pollution in Gaza grants the right to demand the cessation of this internationally unlawful act. Article 30 of the Articles on the Responsibility of States for Internationally Wrongful Acts, adopted by the International Law Commission in its fifty-third

²⁰⁷ *Hague Convention (IV) Respecting the Laws and Customs of War on Land*, 18 October 1907, entered into force 26 January 1910 (*United Nations Treaty Series*, vol. 205, p. 277), Art. 3

²⁰⁸ The effect of international liability is summed up in the duty of the negligent state to repair the damage resulting from the similarity of international liability to civil liability in domestic law. The effect of international liability results in the duty of the negligent state to repair the damage resulting from its actions, whether this behavior is prohibited by law or not, if harm is caused to the other.

²⁰⁹ *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977, entered into force 7 December 1978 (*United Nations Treaty Series*, vol. 1125, p. 3), Arts. 35–55, 91.

²¹⁰ *Ibid.*

session, confirms this under the heading of cessation and assurances of non-repetition.²¹¹ It obligates the responsible state to:

Cease the wrongful act if it continues.

Provide appropriate assurances and guarantees of non-repetition if circumstances require it.

Hence, the Israeli occupation must cease its unlawful practices of polluting the environment. This includes refraining from using prohibited conventional and nuclear weapons, discontinuing the dumping of wastewater into Gaza, and lifting the blockade to enable Gaza to recover its environmental situation through infrastructure reconstruction, the establishment of water desalination plants, and the creation of solid waste disposal sites.

Reparation in kind (restitution)

This term refers to the obligation of a state, which has committed an unlawful act, to restore the situation to what it was before the commission of this act. This entails undoing all the consequences resulting from that unlawful act, effectively bringing things back to the state they were in before the unlawful action occurred. Reparation in kind is considered one of the most direct and effective means of achieving full compensation for harm caused. Article 35 of the draft articles on state responsibility for internationally unlawful acts stipulates that the obligation to make restitution should not be impossible as a matter of fact and should not entail a burden that is clearly disproportionate to the benefit derived from restitution rather than compensation.²¹² While the practical application of this principle to the environmental situation in Gaza may not be straightforward, Israel is obligated to do everything reasonably possible to contribute to the reconstruction of Gaza. This includes rebuilding public facilities and citizens' homes, addressing soil contamination, and replanting vegetation cover. The aim is to restore the situation as closely as possible to what it was before Israel's blockade and successive attacks had severe impacts on the region.

Financial compensation

²¹¹ Fadi Qassem Shadeed, *Protection of Civilians Under Military Occupation in Accordance with the Rules of International Humanitarian Law and International Criminal Law*, 1st ed. (Amman: Fadaat Publishing and Distribution, 2011), p. 95

²¹² Ahmed Abu Al-Wafa, *International Humanitarian Law* (Cairo: Supreme Council of Culture, 2006), p. 88.

While the ideal scenario for compensating harm is to restore the situation to what it was before the unlawful act occurred, there are instances where such restoration becomes practically impossible. In these cases, compensation in the form of monetary payment is used as an alternative. There are situations where restoration is rendered impossible, either due to the destruction of the affected property or its utilization, making monetary compensation the only viable legal recourse. The principle of proportionality between the value of compensation and the extent of environmental damage is crucial.²¹³ Compensation should mirror the actual harm incurred and should encompass both losses sustained by the state and any foregone benefits as a result of the wrongful act.²¹⁴ This principle is enshrined in Article 3 of the 1907 Hague Convention for the land warfare,²¹⁵ as well as Article 53 of the Fourth Geneva Convention and Article 91 of the First Additional Protocol, which emphasize the responsibility for and the payment of compensation in the event of proven violations.²¹⁶

Given the existing environmental conditions in Gaza and the impracticality of returning the environment to its pre-Israeli occupation state due to Israeli practices and military attacks, the optimal and necessary solution is for Israel to provide financial compensation to mitigate the resulting damage. The compensation should be fair and just, considering all types of harm inflicted on the environment in Gaza. Whether the damage is direct, such as the destruction of crops, homes, and infrastructure, or indirect, taking years to manifest, like the effects of waste and toxic materials disposed of in the sea or air pollution resulting from prohibited weapons and attacks, all these forms of damage should be taken into account when determining compensation amounts.

- **Criminal liability**

The legal jurisprudential perspectives on the parties responsible for international criminal liability vary, with three different opinions on this matter:

The first perspective contends that the state alone is responsible for international crimes. This viewpoint is based on the traditional concept that the state is the only subject of

²¹³ Ibid.

²¹⁴ Ibid.

²¹⁵ *Hague Convention (IV) Respecting the Laws and Customs of War on Land*, 18 October 1907, entered into force 26 January 1910 (*United Nations Treaty Series*, vol. 205, p. 277), Art. 3

²¹⁶ Ibid.

international law, and therefore, no one else can be criminally prosecuted. According to this perspective, the state is considered the sole legal entity in international law, and thus, others cannot be held criminally accountable.

The second perspective, in contrast to the first, asserts that criminal responsibility is limited to individuals and cannot be imposed on states. In this view, states cannot be criminally punished, such as imprisonment.

The third perspective represents a middle ground between these two viewpoints. It acknowledges dual responsibility for both the state and the individual. This means that a state whose armed forces commit crimes can be criminally prosecuted, assuming that it has independent will from the individuals under its authority.²¹⁷

These varying perspectives reflect ongoing debates within the realm of international law concerning the attribution of criminal responsibility for international crimes, with each viewpoint having its own implications for how accountability is established and enforced.

Many legal texts in international humanitarian law and conventions recognize individual criminal responsibility for grave violations of international humanitarian law, such as Article 3 of the Fourth Hague Convention of 1907, Article 91 of the First Additional Protocol of 1977, and the common Article in the four Geneva Conventions of 1949.²¹⁸ Additionally, Article 5 of the First Additional Protocol relating to the protection of victims of international armed conflicts considers grave breaches of the conventions and protocols as war crimes. Furthermore, Article 88 of the same protocol grants victims of these grave violations the right to pursue those responsible for committing these crimes and hold them accountable as war criminals.²¹⁹ Article 23 of the Regulations Respecting the Laws and Customs of War on Land of 1907 also prohibits the destruction of a state's property.²²⁰

²¹⁷ Ibid.

²¹⁸ *Hague Convention (IV) Respecting the Laws and Customs of War on Land*, 18 October 1907, entered into force 26 January 1910, *United Nations Treaty Series*, vol. 205, p. 277.

²¹⁹ *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977, entered into force 7 December 1978, *United Nations Treaty Series*, vol. 1125, p. 3

²²⁰ *Regulations Annexed to the Hague Convention (IV) Respecting the Laws and Customs of War on Land*, 18 October 1907, entered into force 26 January 1910, *United Nations Treaty Series*, vol. 205, p. 277, Art. 23

While the Geneva Conventions and the First Additional Protocol do not explicitly include the destruction of the environment as a grave violation, Article 147 of the Fourth Geneva Convention of 1949 deems the widespread, wanton destruction of property that is neither justified by military necessity nor carried out unlawfully and wantonly as a grave breach of the rules of international humanitarian law.²²¹ This article indirectly criminalizes violations of environmental protection rules by using the term "property," which can encompass the environment in its broad sense, including the natural and constructed environment.

Therefore, deliberate attacks on the environment constitute a war crime and individuals who order, plan, or commit these crimes can be criminally prosecuted. Given the documented violations and assaults perpetrated by the Israeli occupation on the environment in Gaza on a daily, deliberate, and continuous basis, such acts fall within the category of war crimes, and individuals responsible for these actions can be pursued and held criminally accountable.

This criminal accountability is carried out in several ways, such as going to the International Criminal Court, taking into account the necessary conditions for the perpetrators of these violations to comply before it, or through the principle of universal jurisdiction. According to this jurisdiction, any country has the right to take judicial measures in relation to some serious crimes, regardless of the location of the crime, and the nationality of the perpetrator or the victim. The only important thing that must be present is the actual presence of the perpetrator within the jurisdiction of that state. In addition, Israel can be criminally prosecuted through the establishment of a special international court to try Israeli war criminals, as The United Nations Security Council, based on its authority under Chapter VII of the United Nations Charter, has the power to create special international courts for the prosecution of individuals who have committed international crimes that threaten international peace and security. Also, Israeli war criminals can be tried before the national courts of states that are parties to the Fourth Geneva Convention and its Additional Protocol. Lastly, they can also face prosecution in the national courts of countries of which they are citizens.

3.2.2 The legal implications of states and third parties:

²²¹ Ibid.

The international legal implications affecting states and third-party entities represent a complex web of responsibilities and consequences within the realm of international law. These implications encompass a wide range of scenarios, from the obligations imposed by international agreements and treaties to the repercussions of actions taken by or against specific states. Understanding and navigating these legal intricacies is crucial in the contemporary global landscape, where international relations, interests, and cooperation are deeply intertwined. In this context, it becomes imperative to explore and comprehend the multifaceted legal dimensions that impact states and third-party actors on the international stage. The evolution of international law, following the establishment of the United Nations Charter, has solidified the concept of a consistent international interest in states' adherence to the principles, rules, and obligations of international law. In this context, states have willingly shouldered the responsibility of promoting and safeguarding international law through treaties, conventions, and international declarations. They have committed themselves to intervene when a member of the international community breaches its legal obligations or engages in unlawful actions under international humanitarian law and international law.

Accordingly, this section will address the legal implications of states and third parties and the implications of the United Nations.

- **Implications of states and third parties:**

Examining the violations committed by the Israeli occupation, as previously stated, reveals that Israel has perpetrated and continues to commit serious breaches of international humanitarian law, which imposes obligations on all parties. Referring to international agreements, conventions, and declarations, these obligations can be divided into negative implications placed upon states. These implications are represented by states refraining from recognizing the facts created by the occupier, as well as ceasing and abstaining from providing any support or assistance that may help the occupying state continue to violate the provisions and principles of international humanitarian law.²²² Therefore, it is imperative for members of the international community not to recognize the practices of the Israeli occupation of the environment in the Gaza Strip, through which it aims to destroy livelihoods and turn it into an

²²² Ibid.

uninhabitable land. All forms of assistance and cooperation that would help the Israeli occupation to continue its violation of the provisions and principles of international humanitarian law related to environmental protection must also be stopped. Additionally, there are positive implications that go beyond passive abstention and protest. They necessitate active and sincere intervention to confront and suppress violations of international humanitarian law. Positive implications in response to Israeli violations of international humanitarian law can be summarized as an intervention to halt these violations, confront them, and support the Palestinian people in resisting such violations. These implications are evident in the rules of international humanitarian law.

Article 1 of the Fourth Geneva Convention states that High Contracting Parties must respect and ensure respect for the Convention under all circumstances.²²³ Furthermore, Article 146 allows a state to prosecute perpetrators of international crimes under its legislation or surrender them to a contracting party for prosecution if the other party has sufficient evidence against these individuals.²²⁴ Moreover, Article 1 of the First Additional Protocol stipulates that High Contracting Parties undertake to respect and ensure respect for this Protocol. Article 86 of the same Protocol requires High Contracting Parties to suppress violations and take necessary measures to prevent further violations of the Convention and this Protocol. Accordingly, these articles impose an obligation on states to take action against the Israeli occupation that deliberately violates the rules and provisions of international humanitarian law, by adopting suitable measures. Such measures can involve administrative, disciplinary, or even criminal sanctions, depending on the gravity of the violation.²²⁵ These provisions also obligate states to either prosecute and pursue perpetrators of these violations or surrender them to the complaining party for trial before their national courts.

²²³ *Geneva Convention Relative to the Protection of Civilian Persons in Time of War (Fourth Geneva Convention)*, 12 August 1949, entered into force 21 October 1950, *United Nations Treaty Series*, vol. 75, p. 287, Article 1.

²²⁴ *Ibid.*, Article 146 provides that the High Contracting Parties undertake to take such legislative action as may be necessary to impose effective penal sanctions on persons who commit or order the commission of any of the grave breaches of this Convention set forth in the following article. Each contracting party is obligated to prosecute those accused of committing such grave violations or to order them to be committed, and to bring them before its courts, whatever their nationality. It may also, if it prefers, and in accordance with the provisions of its legislation, hand them over to another concerned contracting party for trial as long as the aforementioned party has sufficient indictment evidence against these persons. Next article.

²²⁵ *Ibid.*

- **Implications of the United Nations:**

The primary purpose of establishing the United Nations (UN) is to maintain international peace and security. Since it is an international organization, possesses the capacity to take various actions, including military measures, to ensure the realization of international peace and security. This is explicitly indicated in the first paragraph of the UN Charter, which emphasizes the commitment of UN members to save future generations from the scourge of war.²²⁶ Moreover, the fifth paragraph of the Charter addresses the organization of forces to maintain peace and international security. Consequently, the UN has legal obligations concerning environmental violations and unlawful practices carried out by Israel in the Gaza Strip.

Accordingly, the United Nations, particularly through its entities like the Security Council and the General Assembly, must take measures and actions to halt these violations. In this context, we will discuss the roles of the Security Council and the General Assembly in countering Israeli violations of international humanitarian law.²²⁷

Regarding the mechanism through which the United Nations Security Council intervenes to halt Israeli violations, two methods are employed. The first method involves utilizing diplomatic means and non-violent strategies to address Israeli violations. These measures include economic sanctions, transportation suspensions of various kinds, economic penalties, boycotts, and non-renewal of trade agreements, as well as imposing maritime, land, and air blockades, or banning arms exports ... etc.

The second available mechanism for the Security Council to counter Israel's violations and its disregard for international protection rules is the utilization of military force and military measures. It's worth noting that the Security Council is initially obliged to use peaceful means. In the event of their failure and the inability to achieve the intended goal through peaceful

²²⁶Essam El-Din Basim, *The United Nations Organization: A Theoretical Study of the Rules Contained in the Charter and Their Practical Applications through the Activities Carried Out by the Organization* (Cairo: Al-Ashry Press, 2011), p. 77.

²²⁷ Suhail Hussein Al-Fatlawi, *The United Nations (The Goals and Principles of the United Nations)*, *Encyclopedia of International Organizations*, 1st ed., Part 1 (Cairo: Dar Hamid for Publishing and Distribution, 2011), p. 71

measures, the United Nations Security Council can adopt and employ force and military means.²²⁸

As for the intervention of the General Assembly based on Resolution 377 issued on 13 November 1950, which granted the United Nations General Assembly the right to consider all international issues, disputes, and conflicts that threaten and affect international peace and security, and to take appropriate measures and actions, including military intervention, in cases where the United Nations Security Council is proven to be unable to fulfill its mandated obligations and preserve international peace and security. The General Assembly is thus obligated to bear the responsibility of maintaining international peace and security.²²⁹ Therefore, it has a duty to intervene to stop Israeli environmental violations in the Gaza Strip using effective means, including the use of military force, to compel Israel to desist from its practices and adhere to the implementation of international legitimate resolutions issued by the General Assembly and the Security Council, which demand Israel's withdraw from all its unlawful violations. This is especially significant considering that Israel's accession to the United Nations Charter was conditional upon its respect for all international treaties.

3.2.3 International efforts to protect the environment in the besieged Gaza Strip

The Gaza Strip faces many serious environmental challenges as a result of the siege and various Israeli violations against the Strip. However, there are international efforts being made to protect the environment in Gaza. Various international and humanitarian organizations, including the United Nations, seek to provide support and assistance to the residents of the Gaza Strip²³⁰. Among the most prominent international efforts in this context are the efforts of human rights council, the Security Council and the General Assembly. As follows:

- The Human Rights Council:

The Human Rights Council is an international governmental body within the United Nations system responsible for strengthening and promoting all human rights worldwide, as well as addressing cases of human rights violations and providing recommendations on them.

²²⁸ Ibid.

²²⁹ Ibid.

²³⁰ Ibid

The Council was established by General Assembly Resolution 251/60 in 2006. Its work encompasses various mechanisms and procedures, including the Universal Periodic Review mechanism, used to assess the human rights situation in all UN member states, and the Advisory Committee, which serves as the intellectual body of the Council, providing expertise and advice on thematic issues in the field of human rights. The complaints procedure allows individuals and organizations to draw the Council's attention to human rights violations.²³¹ These procedures consist of special rapporteurs, special representatives, independent experts, and working groups. These rapporteurs, representatives, and experts, along with the working groups, monitor thematic issues or human rights situations in specific countries, conduct investigations, offer advice, and publicly report on their findings.²³²

In the context of the Gaza conflict, the Council established committees and temporary fact-finding missions, including the "United Nations Fact-Finding Mission on the Gaza Conflict" on January 12, 2009. This mission was tasked with fact-finding regarding the Gaza conflict and submitted its final report in the twelfth session regarding the ongoing conflict in Gaza in September 2009. The report covered various aspects of the conflict and its impact on the region, including environmental issues, emphasizing that the environment in Gaza was severely affected by Israeli military operations in the area. The report also included a legal analysis highlighting Israeli violations of international humanitarian law and the resulting legal responsibility of Israel as an occupying power.²³³ Subsequently, the Council established a permanent committee to investigate this matter, known as the Independent International Commission of Inquiry on the Occupied Palestinian Territory, created in May 2021. This committee is tasked with investigating violations of international humanitarian law and international human rights law, examining crimes committed, providing recommendations on accountability measures, and making recommendations regarding the responsibility of third parties in ensuring respect for international humanitarian law according to Common Article 1

²³¹ United Nations General Assembly, *Resolution 60/251 Establishing the Human Rights Council*, 15 March 2006, Official Records of the General Assembly, Sixtieth Session, Supplement No. 53 (A/RES/60/251), New York, 2006

²³² "About the Human Rights Council," *United Nations Human Rights Council*, Geneva, n.d.: <https://www.ohchr.org>, accessed 12 May 2023.

²³³ United Nations Human Rights Council, *Fact-Finding Mission on the Gaza Conflict*, established by Resolution S-9, 12 January 2009, final report presented at the 12th session, September 2009, Geneva.

of the Geneva Conventions.²³⁴ Since its inception, this committee has issued three reports containing facts about violations of international humanitarian law and international human rights law in the Palestinian territories, including Gaza. In its report released in September 2022, the committee addressed the blockade suffered by Gaza and affirmed that it affects all aspects of life, including the environment, and that this blockade may amount to the crime of collective punishment.²³⁵ In addition to these committees, the Human Rights Council appointed a Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment in 2012. In order to promote best practices in environmental policy-making, as well as identify challenges and obstacles hindering the enjoyment of this right. This expert submits annual reports to the Council on the right to a clean environment, shedding light through these reports on prominent environmental violations.²³⁶

In 2023, the expert issued report A/HRC/52/33 titled "Women and Girls and the Right to a Clean, Healthy, and Sustainable Environment," highlighting the violation of the right of women and girls to a clean environment based on gender, a situation applicable to women and girls in Gaza who suffer violations of this right due to the blockade and environmental violations practiced by Israel.²³⁷ Additionally, in its report A/77/284 issued in 2022 on the right to a clean, healthy, and sustainable environment, the expert's analysis emphasizes the importance of achieving sustainable environmental development in Gaza. It presents practices and provides recommendations on how to achieve sustainable development goals, and fulfill obligations and responsibilities related to the right to enjoy a clean, healthy, and sustainable environment.²³⁸

- General Assembly:

²³⁴ United Nations Human Rights Council, *Independent International Commission of Inquiry on the Occupied Palestinian Territory*, established May 2021, mandated to investigate violations of international humanitarian and human rights law; report on Gaza blockade, September 2022.

²³⁵ United Nations Human Rights Council, *Special Rapporteur on the Human Right to a Safe, Clean, Healthy and Sustainable Environment*, established 2012, submits annual reports on environmental rights and violations.

²³⁶ United Nations Human Rights Council, *Mandate of the Special Rapporteur on the Human Right to a Safe, Clean, Healthy and Sustainable Environment*, established 2012; tasked with promoting best environmental policy practices and identifying obstacles to the right, submitting annual reports highlighting major environmental violations.

²³⁷ United Nations Human Rights Council, *Women and Girls and the Right to a Clean, Healthy, and Sustainable Environment*, Report of the Special Rapporteur, A/HRC/52/33, Geneva, 29 August 2023; addressing gender-based environmental rights violations affecting women and girls in Gaza due to the blockade and related practices.

²³⁸ United Nations Human Rights Council, *Report on the Human Right to a Clean, Healthy and Sustainable Environment*, A/HRC/37/59, New York, 2018

There are different resolutions by the General Assembly regarding the environmental situation whether in the Gaza Strip particularly or in the Palestinian-occupied territory generally as follows:

Resolution 74/233 (2019): Encourages the improvement of the environmental situation in the Gaza Strip and expresses its concern about environmental destruction in that area.

Resolution 73/21 (2018): Condemns the negative effects of hostilities on the environment in the Gaza Strip and calls for action to preserve the environment and its resources.

Resolution 73/21 (2018): Condemns the hostile actions that lead to the deterioration of the environmental situation in the Palestinian territories.

Resolution 74/233 (2019): Calls for improving the environmental situation in the occupied Palestinian territories, and condemns the widespread destruction of the environment in those areas.

Resolution 74/12 (2019): Emphasizes the need to protect the environment in the occupied Palestinian territories, and calls for international action to prevent environmental destruction.²³⁹

- Security Council:

The Security Council, as a pivotal body in the realm of international peace and security, has played a critical role in addressing various global challenges. Among the issues it has addressed are those pertaining to the conflict in the Gaza Strip and the occupied Palestinian territories. Two notable resolutions, Resolution 1860 (2009) regarding the situation in Gaza, and Resolution 2334 (2016) regarding the Israeli settlements stand as a testament to the Security Council's commitment to finding solutions and mitigating the impact of hostilities on both the environment and the humanitarian situation in Palestine.

Resolution 1860 (2009) emphasizes the imperative need for halting hostile activities in the Gaza Strip. It further underscores the necessity for improving the environmental and humanitarian conditions in the region. This resolution reflects the Security Council's recognition of the multifaceted dimensions of the situation, including its environmental ramifications.

Likewise, Resolution 2334 (2016) staunchly condemns the construction of Israeli settlements in the occupied Palestinian territories. It recognizes the potentially adverse effects of such settlements on the environment, not only within the specific areas but also with a potential broader impact on the region. This resolution reflects the Security Council's determination to

²³⁹ United Nations General Assembly, *74th Regular Session, A/74/1*, New York, 2019.

address issues that have far-reaching consequences, including those related to the environment.

240

These resolutions stand as a testament to the Security Council's ongoing efforts to find viable and sustainable solutions to complex conflicts, while also acknowledging the broader implications, including those that bear on the environment in the Gaza Strip and beyond. Also it represents international attempts to deal with environmental protection issues in the Gaza Strip and emphasize the importance of preserving the environment during armed conflicts and difficult humanitarian situations.

Resolutions of the General Assembly and the Security Council of the United Nations can contribute significantly to improving the environmental situation in the Gaza Strip. These decisions play a vital role in increasing international awareness about the environmental challenges in the region and enhancing international pressure to improve the situation. The United Nations and its organizations also monitor and evaluate the environmental situation periodically to identify critical issues and take necessary measures. In this context, these decisions work to coordinate international efforts and enhance cooperation between countries and international organizations to achieve tangible environmental improvements in the Gaza Strip.

²⁴⁰ United Nations Security Council, Resolution 1860, S/RES/1860 (2009), adopted on 8 January 2009.

Results

There are many international agreements and legal articles in international law concerned with providing protection for the environment during armed conflicts, directly or indirectly. However, it did not guarantee effective and comprehensive environmental protection. This is due to the imprecise wording of rules and principles related to environmental protection, which leaves room for wide interpretations. In addition, these rules and principles have remained largely theoretical and have not been effectively applied in practice.

1. The siege and wars in the Gaza Strip negatively affect the local environment in all its aspects, including water and soil pollution, and the destruction of environmental infrastructure. They also affect sustainable development and preservation of the ecosystem.
2. Environmental crimes fall within the framework of aggression crimes, which are among the most widespread crimes today. This has drawn special attention from the International Criminal Court.
3. Violations against the environment in the Palestinian territories represent a flagrant violation of international obligations and treaties, which therefore imposes international responsibility on the State of Israel. These conclusions come in the wake of serious violations of international humanitarian law committed by Israel in the Palestinian territories.
4. International responsibility expands to include states, individuals and non-international groups with regard to pollution and environmental damage resulting from armed conflicts. Accordingly, individuals can be held criminally responsible at the international level for crimes committed against the environment.
5. There are challenges facing achieving international accountability in cases of environmental violations during conflicts, including the difficulty of documenting evidence, determining the responsible party, and weak effective implementation of legal decisions.
6. States parties to the Geneva Conventions have a duty to prosecute Israel and hold it accountable for the crimes committed in the Gaza Strip.
7. The lack of accurate databases and information about Israeli environmental violations in Palestine, especially in the Gaza Strip. That is, there is a deficiency in the efforts made to monitor and document the occupation's environmental violations.

Conclusion

In conclusion, the issue of environmental protection and the establishment of the necessary legal frameworks to ensure its protection have become vital and contemporary topics in the international community. These topics have garnered significant attention from various international bodies and organizations.

Given the environmental degradation in the Gaza Strip since the imposition of the blockade, resulting in comprehensive pollution of its resources and posing a threat to human survival, it is crucial to shed light on this issue. And it's worth noting that Israel consistently launches attacks on the Gaza Strip, resulting in negative and destructive effects on the environment and population.

With the increasing environmental violations and violations of international humanitarian law, especially with the use of highly lethal Israeli weaponry, which is internationally prohibited, and given the modern mechanisms for prosecuting the perpetrators of these violations, this thesis becomes a pressing necessity.

This thesis encompassed the international humanitarian legal framework for environmental protection, tracing its evolution through international agreements and conventions related to this field and Israel's domestic environmental laws, which internationally bind Israel to abstain from environmental violations. Additionally, it delved into the international mechanisms for environmental protection in international humanitarian law.

Furthermore, the thesis explored the international responsibility for environmental violations, delineating its conditions and establishing the illegitimacy of Israeli environmental violations in Gaza strip. It highlighted that the State of Israel stands outside the realm of international law and legitimacy due to its hazardous breaches of international humanitarian law and legal regulations pertaining to environmental protection in Palestinian territories.

Finally, the thesis examined the civil, criminal, and penalties resulting from the occupation's actions. It also elucidated the obligations imposed on other parties concerning Israeli environmental violations in Palestinian territories.

This thesis has yielded several results and recommendations, which are outlined as follows:

Recommendations

Working to form an international committee concerned with interpreting legal texts that carry multiple interpretations, and improving accuracy and clarity in the formulation of international laws and principles related to environmental protection during armed conflicts, which enhances their effective application in the practical field. In addition to working to develop legal texts to comply with developments in the arms industry and developments in the comprehensiveness of the concept of the environment.

1. Developing strategies to deal with the negative environmental impacts of the blockade and wars in the Gaza Strip, including preserving water and soil quality and restoring environmental infrastructure.
2. Encouraging the Palestinian authorities to request the International Criminal Court to hold Israel accountable for the crimes it committed in the Gaza Strip, in accordance with international agreements, by building a legal file to follow up on the trial of Israeli occupation officials through the International Criminal Court and national courts with global jurisdiction.
3. Develop accurate databases and documented information about Israel's environmental violations in Palestine, and strengthen monitoring and documentation efforts for these violations.
4. Encouraging States Parties to the Geneva Conventions to hold Israel legally responsible for the crimes it committed in the Gaza Strip.
5. Supporting technological research and development efforts for innovative environmental technologies aimed at strengthening environmental conservation in affected areas.
6. Encouraging the international community to enhance awareness of the importance of protecting the environment during armed conflicts and supporting efforts to implement and strengthen international environmental standards.

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Appendices

Telephone Interview No. 1

Mr. Iyad Al-Alami, Palestinian Center for Human Rights for Legal Affairs

First Speaker: Can you first provide a brief introduction of yourself and the Palestinian Center for Human Rights?

Second speaker: My name is Iyad Al-Alami, I'm Deputy Director of the Palestinian Center for Human Rights for Legal Affairs.

the Palestinian Center for Human Rights is an independent legal body dedicated to protecting human rights, respecting the rule of law, and upholding the principles of democracy in the occupied Palestinian territories. the Palestinian Center for Human Rights is an independent legal body dedicated to protecting human rights, respecting the rule of law, and upholding the principles of democracy in the occupied Palestinian territories. The Center's work is concentrated on monitoring, recording, and looking into cases of human rights violations. It also offers legal advice and assistance to both individuals and groups and conducts research and studies on situations involving the rule of law and human rights. The Center also offers feedback on proposed Palestinian laws and supports the adoption of legislation that complies with fundamental democratic principles and international human rights norms.

First speaker: My thesis focuses on the role of international law in the environmental protection in the Gaza Strip. I would like to ask you some questions in this context

What are the most prominent environmental violations to which the Gaza Strip is exposed as a result of the Israeli occupation practices?

Has the blockade further deteriorated the environmental situation in the Gaza Strip?

In your opinion, can the environmental situation in the sector recover?

Second speaker: Well, the occupation's practices in the Gaza Strip have led to a significant deterioration of the environment in the Gaza Strip, and this is reflected in the various forms of the environment, whether living or non-living. There are many reports prepared by the center that monitor and document these environmental impacts with percentages and numbers, which

I will send to you via email to review. As for the blockade, it certainly has an impact on increasing environmental deterioration. People in Gaza live in difficult and very bad conditions. There is a high population density and a scarcity of environmental resources, which results in an exacerbation of the difficulty of the environmental situation. For example, each person in Gaza produces about 9 kilograms solid waste per a day, and there are not enough landfills to accommodate this amount. You can imagine that about two and a quarter million people consume water from scarce resources, and this reflects a negative impact on the environment, entirely as a result of the blockade. If we are going to talk about recovering the environmental situation in the sector, it needs major international and local efforts. The sector is suffering from the destruction of infrastructure, seawater pollution, soil pollution, water scarcity, and many, many others. Working to recover the situation requires a large budget, and more importantly than the budget, we need to open the crossings, as many of the materials needed for reconstruction are prevented from entering the Gaza Strip under the pretext of dual use.

First Speaker: Well thank you for your time.

Second Speaker: You're welcome. I hope I've helped you. Good luck.

Interview No.2**Mr. Murad Al-Madani, Environmental Quality Authority**

First speaker: Could you introduce yourself please? What is the nature of your work?

Second speaker: I am Mr. Murad Al-Madani, I hold a master's degree in public law on state responsibility for environmental damage. I work as a legal advisor to the Ministry of Environmental Affairs / Palestinian National Authority.

First speaker: Sir, I would like to discuss with you the issue of environmental protection, and the nature of the Israeli violations of the environment in the Gaza Strip, as I am preparing my master's thesis and it revolves around the environmental violations of the Israeli occupation in the Gaza Strip, and there are some questions that I would like to ask if you do not mind that?

Second speaker: Well, actually, I don't mind that, and I am happy to help you as much as possible, but in reality, due to political circumstances, the information available to us about environmental violations in the Gaza Strip is very scarce, and I cannot provide you with any information about that. But I do not mind helping you with any other information related to the West Bank.

First speaker: Well, thank you, but in fact, my thesis revolves around the environmental situation in the Gaza Strip and I am concerned with information about the Strip and not the West Bank.

Second speaker: I apologize, but we do not have any information that can be provided about that, but if you want any other information, you are welcome.

Interview No. 3**A telephone interview with Samir Manama, Al Mezan
Center for Human Rights**

First speaker: Hello sir, in fact, I am preparing my master's thesis on the role of international law in protecting the environment in the Gaza Strip. I would like to ask you some questions if you don't mind.

Second speaker: Well, of course.

First speaker: First of all, can you introduce yourself?

Second speaker: I am Samir Al-Manaama, a lawyer in the Legal Aid Unit at Al Mezan Center for Human Rights.

First speaker: What are the most prominent environmental violations in the Gaza Strip?

Second speaker: The environmental violations in the Gaza Strip are many and varied, including water pollution, air pollution, and soil pollution, in addition to the destruction of infrastructure, solid waste, and others.

First speaker: Are there accurate percentages and numbers that have been monitored regarding the current environmental situation in the sector?

Second Speaker: The Center prepares reports and studies on the situation in the Gaza Strip. You can visit the Center's website and browse these studies, or if you wish, I can send you the relevant reports and studies via e-mail.

First speaker: Well, in your opinion, what are the effects of the blockade on the environmental situation in the Gaza Strip?

Second speaker: The siege has contributed greatly to the worsening of the environmental situation. People in Gaza live in nothing more than an open-roof prison. The siege has affected people's access to basic facilities for living, such as water and other things, and this has greatly contributed to increasing pressure on water resources and the environment. The blockade also directly affected the increase in the poverty rate, and thus people tended to search for livelihoods and turned a blind eye to the environmental situation, which made the chance of deterioration

of the environmental situation greater, in addition to the high population density, which constitutes a source of pressure on environmental resources. The siege also contributed to the deterioration of health conditions. It is known that health services in Gaza are limited and patients go for treatment outside Gaza, but there are difficulties they face.

Since the closure of the Rafah crossing in June 2007, there has been a significant rise in the number of patients departing Gaza through the Erez crossing. However, a significant percentage of patients faced challenges in crossing due to rejection or disability imposed by Israeli authorities. The percentage of patients unable to cross increased from 9.8% in 2006 to 22.5% in the first nine months of 2008. This means that approximately 2,691 patients, suffering from conditions such as cancer, heart disease, and other complex medical conditions, were unable to access the necessary treatment due to the blockade and restrictions imposed by Israeli authorities on the Strip. If you want any other, more accurate information, I advise you to go to the center's website.

First speaker: Well, thank you for your time.

Second speaker: You are welcome. I wish you success. If you want any help, email me.

ملخص

تتناول هذه الرسالة دراسة شاملة للانتهاكات البيئية في قطاع غزة، وتشمل الوضع البيئي، الأطر القانونية، والمسؤوليات الدولية. تتناول الدراسة الانتهاكات الإسرائيلية مثل التلوث، تدمير المواطن الطبيعية، واستنزاف الموارد. كما تناقش الرسالة تأثير الحصار على البيئة.

علاوة على ذلك، تحلل الرسالة القوانين البيئية الدولية، مستكشفة الأسس القانونية لحماية البيئة، بما في ذلك المعاهدات والاتفاقيات الدولية ذات الصلة، والقانون الدولي الإنساني، وحقوق البيئة. كما تدرس الرسالة الآليات القانونية الدولية المصممة لحماية البيئة.

بالإضافة إلى ذلك، تتناول الرسالة المسؤولية القانونية عن انتهاكات قواعد حماية البيئة في قطاع غزة، موضحة مفهوم المسؤولية الدولية ومبادئها القانونية والالتزامات المرتبطة بها. كما تقيم الدراسة التداعيات القانونية للاحتلال الإسرائيلي على البيئة في غزة، وتناقش مسؤوليات الدول والأطراف الثالثة في التعامل مع الانتهاكات الإسرائيلية.

ختامًا، تقدم الدراسة نتائج وتوصيات شاملة تهدف إلى المساهمة في الحفاظ على البيئة في قطاع غزة وتعزيز المساءلة بشأن الانتهاكات البيئية، على سبيل المثال، هناك نقص في قواعد البيانات والمعلومات الدقيقة المتعلقة بالانتهاكات الإسرائيلية للبيئة في فلسطين، وضعف في جهود المراقبة والتوثيق لهذه الانتهاكات، الأمر الذي يتطلب العمل على مراقبة وتوثيق فعال لبناء أرشيف معلومات دقيق حول الانتهاكات الإسرائيلية للبيئة الفلسطينية عامةً وقطاع غزة خاصةً، على أن تدعم هذه التوثيقات بالأدلة والشهادات لمساءلة الاحتلال عن جرائمه كلما أمكن ذلك.

الكلمات المفتاحية: الآليات الدولية، المسؤولية الدولية، الانتهاكات الإسرائيلية للبيئة، قطاع غزة، حماية البيئة، القانون الدولي الإنساني.