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International Responsibility of States Arising from Environmental Obligations within the Framework of International Humanitarian Law

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The environment in international armed conflicts is among the areas that are directly and indirectly exposed to severe, long-lasting, and sometimes irreparable harm. The use of biological, chemical, and nuclear weapons, the destruction of oil wells and platforms, attacks on dams and infrastructural facilities, and the devastation of natural resources are among the most significant examples of environmental damage caused by war. The purpose of this article is to examine the international responsibility of states arising from breaches of environmental obligations within the framework of international humanitarian law and to assess the effectiveness of the existing rules in this field. The research method is descriptive-analytical and based on library research. The findings indicate that although instruments such as the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, known as the ENMOD Convention (1976), and Additional Protocol I (1977) to the four Geneva Conventions are among the most important protective instruments concerning environmental protection in armed conflicts, weak enforcement guarantees, the absence of an effective supervisory mechanism, and the incomplete consolidation of certain rules as international custom have resulted in the relative ineffectiveness of these regulations. A comparison of the international community's response to environmental damage in the Iraq-Iran War and the Iraq-Kuwait War also shows that the application of the international responsibility of states in this field has not always been uniform and, in some cases, has been influenced by political considerations. Therefore, strengthening enforcement guarantees, establishing an independent supervisory mechanism, and obligating violating states to provide full reparation for environmental damage are fundamental necessities of contemporary international law.

Keywords: *international responsibility of states, environmental obligations, international humanitarian law, environment, armed conflicts, reparation.*

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1. Introduction

Armed conflicts, particularly in the contemporary period, are no longer limited to the destruction of military forces or combat-related installations; rather, they generate extensive consequences for human life, civilian infrastructure, natural resources, and the environment as a whole. The environment, as the fundamental basis of human life and social continuity, may be severely damaged during wars through the use of destructive weapons, attacks on oil facilities, bombardment of industrial infrastructure, contamination of water and soil resources, destruction of agricultural lands, and degradation of natural ecosystems. The distinctive feature of environmental

damage is that, unlike many conventional forms of wartime destruction, its effects are not confined to the period of hostilities. Such damage may continue after the end of armed conflict, disrupt the livelihood of civilian populations, undermine public health, and impose burdens on future generations (Bakhtiari Asl, 1997; Raei-Dehghi & Najafi, 2016).

International humanitarian law emerged to limit the effects of war and to protect persons and property during armed conflicts. Its classical function has been to regulate the conduct of hostilities, restrict the means and methods of warfare, and protect those who do not or no longer participate in hostilities. Nevertheless, the transformation of warfare, the development of highly destructive weapons, and the growing ecological consequences of military operations have made environmental protection an important concern within this branch of international law. In this respect, the environment is not merely a passive object damaged incidentally by warfare; it is a legal interest whose protection is connected to human survival, civilian life, food security, access to water, and the post-conflict reconstruction of societies (Anthony & Rogers, 2003; Fleck, 2013; Ziaei Bigdeli, 2013b).

The relationship between war and the environment has acquired particular significance because modern armed conflicts often affect natural resources and ecological systems in a cumulative and long-term manner. Damage to oil wells, petrochemical facilities, dams, forests, wetlands, agricultural lands, and water networks may produce consequences that extend beyond the battlefield and even beyond the territory of the belligerent states. Such damage challenges the traditional distinction between military objectives and civilian objects, because the destruction of environmental resources may indirectly but seriously affect civilian populations. Accordingly, contemporary international law increasingly requires that military operations be evaluated not only in terms of immediate military advantage but also in light of their ecological consequences and humanitarian effects (Koivurova, 2015; Pourhashemi & Tayebi, 2015; Taghizadeh Ansari, 2016).

Within this framework, instruments such as the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, known as the ENMOD Convention of 1976, and Additional Protocol I of 1977 to the Geneva Conventions have established rules prohibiting or restricting methods and means of warfare that cause severe environmental harm. These instruments demonstrate that environmental protection in armed conflict is not merely a moral or political concern but also a legal obligation. However, the central issue is that the existence of legal rules alone is not sufficient to ensure effective protection of the environment. If such rules lack strong enforcement mechanisms, if their concepts are interpreted narrowly, or if their application is influenced by political considerations, the international responsibility of states cannot operate effectively (Henckaerts & Doswald-Beck, 2012; Navadeh Topchi, 2014; Sassoli et al., 2011).

The experience of Iraq's war against Iran and Iraq's war against Kuwait illustrates this difficulty. In the former case, extensive environmental damage was inflicted, but the issue did not receive effective international attention and no comprehensive compensatory mechanism was established. In the latter case, however, environmental damage was identified, assessed, and compensated through an international mechanism. This comparison reveals that the enforcement of state responsibility for wartime environmental harm has not always followed a uniform and impartial pattern. Rather, it has sometimes been shaped by political will, institutional capacity, and the strategic interests of powerful actors in the international system (Heydari & Abbasi, 2016; Jalalian, 2015; Omidy, 2012).

Therefore, the present study examines the international responsibility of states arising from environmental obligations within the framework of international humanitarian law. It seeks to clarify the legal foundations of this responsibility, evaluate the adequacy of existing rules, and analyze the extent to which states can be held responsible for environmental damage caused during armed conflicts. The central concern of the article is not merely the recognition of environmental obligations in wartime, but the effectiveness of the legal system in ensuring accountability, reparation, and non-repetition when such obligations are violated.

The main problem of this research is the examination of the foundations and scope of the international responsibility of states for environmental damage resulting from armed conflicts. In international law, state responsibility arises when an international obligation is

breached and the wrongful conduct is attributable to a state. This general framework applies to all fields of international law, including international humanitarian law and international environmental law. Accordingly, where a state violates its environmental obligations during an armed conflict through the use of prohibited or excessively destructive means and methods of warfare, the question of international responsibility may arise (Dixon, 2017; Gol, 2010; United Nations International Law, 2011).

According to the general law of state responsibility, the existence of an internationally wrongful act requires two elements: first, conduct consisting of an action or omission that breaches an international obligation; and second, the attribution of that conduct to the state under international law. Once these elements are established, the responsible state is under an obligation to cease the wrongful conduct, offer appropriate assurances and guarantees of non-repetition, and make full reparation for the injury caused. In the context of environmental damage during armed conflict, this general structure raises complex questions concerning attribution, causation, the identification of the injured state or protected interest, and the valuation of environmental harm (Brownlie, 2006; Hamidzadeh, 2005; Helmi, 2006). The problem becomes more complicated when environmental obligations are examined within the framework of international humanitarian law. International humanitarian law permits the use of force within certain limits during armed conflict, but it does not permit unlimited destruction. Military necessity cannot justify every form of environmental devastation. The principles of distinction, proportionality, precaution, and limitation of means and methods of warfare impose restrictions on belligerents. However, the application of these principles to environmental harm is often difficult because environmental damage may be indirect, delayed, cumulative, or scientifically complex to prove (Fleck, 2013; Queguiner, 2006; Sassoli et al., 2011).

The essential question is whether existing rules of international humanitarian law have succeeded in protecting the environment against wartime damage and whether, in cases of violation, they have effectively required the responsible state to make reparation. Instruments such as Additional Protocol I of 1977 and the ENMOD Convention of 1976 appear to provide important legal frameworks for environmental protection. Nevertheless, practical experience shows that these rules have not always been implemented effectively. The high threshold of harm required by some provisions, the lack of a permanent supervisory institution, and the absence of automatic enforcement mechanisms have weakened the practical effect of these norms (Jalalian, 2015; Raei-Dehghi & Najafi, 2016; Saed, 2014).

Therefore, the fundamental problem addressed in this research is why, despite the recognition of environmental obligations within international humanitarian law, the international responsibility of states for breaches of these obligations remains weak, selective, and unequal in practice. The study proceeds from the assumption that the normative development of international law has not been matched by an equally effective enforcement structure. As a result, the legal recognition of environmental protection in armed conflict has often remained at the declaratory level and has not always produced effective accountability.

The importance of this subject can be understood from several perspectives. First, the environment is not a merely national or regional matter; it is closely connected to health, security, development, human dignity, and the rights of future generations. Environmental damage caused by armed conflict may undermine water security, food production, biodiversity, public health, and the social conditions necessary for post-war recovery. For this reason, the protection of the environment in armed conflict must be regarded as a matter of common international concern rather than as a secondary issue subordinated entirely to military necessity (Brown Weiss & Saed, 2001; Kiss et al., 2000; Koivurova, 2015).

Second, environmental damage arising from armed conflicts often has persistent and transboundary effects. Pollution of rivers, seas, wetlands, forests, and atmospheric resources may continue long after the end of hostilities and may affect neighboring states or shared natural resources. The long-term character of such damage makes traditional forms of post-war reconstruction insufficient. Rebuilding destroyed buildings or infrastructure may be possible within a defined period, but restoring contaminated soil, damaged ecosystems, or destroyed biodiversity may require decades, and in some cases full restoration may

be impossible (Hawksworth & Bull, 2006; Miller, 1998; Purkhabaz & Purkhabaz, 2002).

Third, weakness in the system of international responsibility in this field may encourage states to disregard the environmental consequences of their military operations. If states know that environmental damage caused during armed conflict will not be independently assessed, legally attributed, and effectively compensated, the deterrent function of international law will be weakened. In this regard, the international responsibility of states is not merely a remedial mechanism; it also has a preventive function. The possibility of legal accountability may influence the planning and conduct of military operations and encourage states to adopt precautionary measures before and during hostilities (Raeisi, 2008; Shamsaei & Salimi Torkamani, 2008; Taghizadeh Ansari & Faeghi Rad, 2010).

Furthermore, the comparative examination of Iraq's war against Iran and Iraq's war against Kuwait demonstrates that the application of international responsibility for environmental damage has not been governed by a single, impartial, and consistent approach. The different treatment of these two cases reveals the need to reconsider the enforcement structure of existing rules and to establish independent mechanisms for identifying, assessing, recording, and compensating wartime environmental damage. Without such mechanisms, the implementation of state responsibility may remain dependent on political circumstances rather than legal criteria (Heydari & Abbasi, 2016; Jalalian, 2012; Omidy, 2012).

The necessity of this research also lies in the fact that the convergence of international environmental law and international humanitarian law is still developing. While environmental law emphasizes prevention, precaution, sustainable use of resources, and intergenerational equity, humanitarian law focuses on limiting the effects of warfare. Bringing these two branches together can strengthen the legal basis for environmental protection in armed conflicts and contribute to a more coherent understanding of state responsibility in contemporary international law (Kulasooriya & Robinson, 2011; Pourhashemi & Arghand, 2013; Yousefi & Zandi, 2015).

The main research question is as follows: What are the foundations and limits of the international responsibility of states arising from environmental obligations within the framework of international humanitarian law, and why is this responsibility not applied effectively and non-selectively in practice?

The subsidiary questions are as follows: What are the most important international rules and instruments governing the protection of the environment in armed conflicts? What is the position of the ENMOD Convention of 1976 and Additional Protocol I of 1977 in protecting the wartime environment? What does the comparison between Iraq's war against Iran and Iraq's war against Kuwait reveal about the application of the international responsibility of states? What legal and institutional solutions can be proposed to strengthen the enforcement of environmental obligations of states in armed conflicts?

The hypothesis of the research is that although international humanitarian law and instruments such as the ENMOD Convention and Additional Protocol I have provided the necessary legal foundations for protecting the environment during armed conflicts, weak enforcement guarantees, the absence of an effective supervisory body, the incomplete consolidation of certain rules as customary international law, and the influence of political considerations have prevented the full and equal application of the international responsibility of states for environmental damage.

This hypothesis is based on the distinction between the normative existence of a legal rule and its practical enforceability. In other words, the mere existence of treaty provisions or general principles does not necessarily guarantee effective protection. For a legal rule to produce practical consequences, it must be accompanied by mechanisms of monitoring, fact-finding, attribution, assessment of damage, and reparation. The weakness of each of these components can reduce the effectiveness of state responsibility in the field of wartime environmental damage (Dixon, 2017; Gol, 2010; United Nations International Law, 2011).

The hypothesis also assumes that political selectivity is one of the most serious obstacles to the equal application of international responsibility. Where the identification and compensation of environmental damage depend on political decisions rather than legal criteria, similar violations may receive different responses. Such selectivity undermines the credibility of international law and weakens the principle that all states are equally

bound by international obligations (Ahmadinejad, 2012; Haddadi, 2010; Sharifi, 2009).

2. Research Method

The research method in this article is descriptive-analytical and is based on library research. In the descriptive part, the study explains the main concepts, including the international responsibility of states, environmental obligations, international humanitarian law, armed conflict, environmental damage, and reparation. In the analytical part, the study examines the relationship between these concepts and evaluates the effectiveness of the legal rules governing environmental protection in armed conflicts.

The research relies on legal sources, doctrinal analysis, and the interpretation of relevant international instruments. Particular attention is given to Additional Protocol I of 1977 and the ENMOD Convention of 1976 as two principal instruments concerning the protection of the environment during armed conflict. The study also draws on the general law of state responsibility, especially the principles concerning breach of international obligations, attribution, cessation, non-repetition, and reparation (Gol, 2010; Omidy, 2012; United Nations International Law, 2011).

In addition, the article uses comparative case analysis to evaluate the practical operation of the rules. The cases of Iraq's war against Iran and Iraq's war against Kuwait are analyzed in order to show how international mechanisms have responded differently to environmental damage caused during armed conflicts. This comparative method makes it possible to identify the gap between legal norms and their enforcement and to assess whether the existing system of international responsibility operates consistently or selectively (Heydari & Abbasi, 2016; Jalalian, 2012; Raei-Dehghi & Najafi, 2016).

The library-based nature of the research is appropriate because the subject requires analysis of legal texts, international instruments, scholarly writings, and documented historical examples. The purpose is not empirical measurement but legal evaluation. Therefore, the research seeks to clarify concepts, interpret legal rules, compare practical examples, and propose legal-institutional solutions for strengthening accountability in the field of wartime environmental damage.

3. The Concept of the International Responsibility of States

The international responsibility of states is one of the foundational concepts of public international law. It arises when a state breaches an international obligation and the conduct constituting that breach is attributable to the state under international law. In such a situation, the responsible state is required to eliminate the consequences of the breach and make reparation for the injury caused by its conduct. Therefore, two essential elements are required for the establishment of international responsibility: breach of an international obligation and attribution of the wrongful conduct to the state (Brownlie, 2006; Dixon, 2017; United Nations International Law, 2011).

International responsibility performs several functions in the international legal order. It affirms the binding character of international obligations, provides a legal basis for claims by injured states, and establishes consequences for internationally wrongful acts. Without the concept of responsibility, international obligations would lack practical effect because there would be no legal consequence for their violation. Thus, responsibility links primary rules, which define obligations, with secondary rules, which determine the consequences of breach (Gol, 2010; Helmi, 2006; Ziaei Bigdeli, 2013a).

In the environmental context, international responsibility may arise where a state causes transboundary harm, breaches treaty obligations, violates customary duties of prevention or due diligence, or fails to comply with obligations related to environmental protection. In the context of armed conflict, this responsibility may be invoked when a state uses prohibited weapons, attacks environmentally sensitive facilities without justification, destroys natural resources unnecessarily, or employs means and methods of warfare that cause widespread, long-term, and severe environmental damage (Omidy, 2012; Raeisi, 2008; Taghizadeh Ansari & Faeghi Rad, 2010).

The consequences of responsibility may include cessation of the wrongful act, assurances and guarantees of non-repetition, restitution, compensation, satisfaction, or a combination of these forms of reparation. In environmental cases, compensation may be particularly important, but it is not always sufficient. Where environmental damage is irreversible, financial

compensation cannot fully restore the damaged ecosystem. Therefore, the concept of full reparation must be interpreted broadly to include restoration, rehabilitation, monitoring, and preventive measures designed to avoid future harm (Bahrami Ahmadi & Alamkhani, 2013; Council of, 1993; Matsui, 2002).

The international responsibility of states in the field of wartime environmental damage therefore reflects the intersection of accountability, prevention, reparation, and justice. It requires that states not only respect environmental obligations during armed conflict but also bear the legal consequences of violations. This is especially important because environmental harm caused during war may affect populations who had no role in the conflict and may continue to suffer after the formal end of hostilities.

4. Environmental Obligations of States in Armed Conflicts

The environmental obligations of states during armed conflicts arise from the interaction between international environmental law and international humanitarian law. International environmental law emphasizes the protection of natural resources, the prevention of pollution, ecological balance, sustainable development, and the protection of the rights and interests of present and future generations. International humanitarian law, by contrast, seeks to limit the effects of armed conflict and regulate the conduct of hostilities. When these two fields intersect, states are required to conduct military operations in a manner that avoids unnecessary and excessive environmental harm (Kulasooriya & Robinson, 2011; Pourhashemi & Arghand, 2013; Taghizadeh Ansari, 2016).

During war, states cannot justify every form of environmental destruction by invoking military necessity. Military necessity is not an unlimited concept; it must be applied in conjunction with the principles of distinction, proportionality, precaution, and humanity. Attacks that destroy environmental resources indispensable to civilian survival or cause damage that is excessive in relation to the anticipated military advantage may violate international humanitarian law. Similarly, methods of warfare that produce widespread, long-term, and severe damage to the natural environment may fall within the scope of prohibited conduct (Fleck, 2013; Queguiner, 2006; Sassoli et al., 2011).

The principle of distinction requires belligerents to distinguish between military objectives and civilian objects. Environmental resources are often civilian in character, especially when they sustain civilian populations. Forests, agricultural lands, rivers, water systems, and energy infrastructure may have strategic value, but their destruction may also cause serious humanitarian consequences. The principle of proportionality requires that incidental civilian harm, including environmental harm affecting civilians, must not be excessive in relation to the concrete and direct military advantage anticipated. The principle of precaution requires parties to take feasible measures to avoid or minimize such harm (Anthony & Rogers, 2003; Henckaerts & Doswald-Beck, 2012; Navadeh Topchi, 2014).

Environmental obligations during armed conflict also have a preventive dimension. States must consider environmental risks in military planning, target selection, weapons use, and post-attack assessment. This requires legal advisers, military commanders, and policymakers to evaluate environmental consequences before operations are carried out. In this sense, environmental protection is not only a post-conflict matter of compensation; it is also a wartime obligation of prevention and precaution (Queguiner, 2006; Saed, 2014; Sharifi Tarazkouhi, 2000).

Accordingly, the obligation of states to avoid wanton environmental destruction and to repair damage caused by breach of these obligations represents one of the important manifestations of international responsibility in the contemporary period. The effectiveness of this obligation depends on whether international law can transform environmental protection from a general value into an enforceable legal duty during armed conflict.

5. The Position of International Humanitarian Law in Environmental Protection

International humanitarian law initially focused primarily on the protection of human beings, including prisoners of war, the wounded and sick, and civilians. However, the expanding destructive capacity of modern warfare gradually led to the recognition that the environment itself requires protection within the law of

armed conflict. Environmental destruction in war does not merely damage nature; it also threatens civilian life, public health, food security, access to water, cultural continuity, and the possibility of post-conflict reconstruction (Anthony & Rogers, 2003; Dunant, 1986; Fleck, 2013).

The protection of the environment under international humanitarian law can be understood in two ways. First, the environment may receive direct protection through provisions that specifically prohibit methods and means of warfare causing widespread, long-term, and severe damage to the natural environment. Second, it may receive indirect protection through general humanitarian rules protecting civilian objects, objects indispensable to the survival of the civilian population, water resources, agricultural areas, and infrastructure. This dual structure shows that environmental protection is not external to humanitarian law but embedded within its humanitarian logic (Henckaerts & Doswald-Beck, 2012; Raei-Dehghi & Najafi, 2016; Sassoli et al., 2011).

The importance of international humanitarian law in environmental protection lies in the fact that it applies during armed conflict, precisely when ordinary peacetime environmental regulations may be weakened or disregarded. Armed conflict creates exceptional conditions in which states may prioritize military objectives and security concerns. International humanitarian law therefore serves as a normative framework that limits military discretion and preserves minimum standards of humanity, including standards related to environmental protection (Delkhosh, 2009; Saed, 2006; Ziaei Bigdeli, 2013b).

Nevertheless, the ability of humanitarian law to protect the environment depends on the interpretation and enforcement of its principles. If the threshold of prohibited environmental damage is interpreted too narrowly, many serious forms of ecological harm may escape legal responsibility. Likewise, if environmental protection is always subordinated to military necessity, the practical significance of relevant rules will be reduced. Therefore, the environmental dimension of humanitarian law must be interpreted in light of the broader purposes of the law of armed conflict, including humanity, limitation, and the prevention of unnecessary suffering (Meron, 2000; Momtaz & Ranjbarian, 2007; Saed, 2008).

In this respect, the protection of the environment in armed conflicts should be understood as part of the broader evolution of international humanitarian law. The law of war has gradually moved from a narrow focus on combatants and military necessity toward a more comprehensive concern with human security, civilian survival, and the long-term consequences of warfare. Environmental protection is an essential component of this evolution.

6. Important Instruments for the Protection of the Environment in Armed Conflicts

The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, known as the ENMOD Convention of 1976, is one of the most important international instruments concerning environmental protection in the context of armed conflict. This convention prohibits the hostile use of environmental modification techniques that, through the deliberate manipulation of natural processes, may produce widespread, long-lasting, or severe effects. Its significance lies in the fact that it directly addresses the use of the environment as a weapon of war and seeks to prevent the manipulation of natural forces for hostile purposes (Bakhtiari Asl, 1997; Heydari & Abbasi, 2016; Raei-Dehghi & Najafi, 2016).

Additional Protocol I of 1977 to the Geneva Conventions is another central instrument in this field. It restricts methods and means of warfare that are intended or may be expected to cause widespread, long-term, and severe damage to the natural environment. It also reflects the broader humanitarian principle that warfare is not unlimited and that military operations must be conducted within legal constraints. The Protocol is significant because it integrates environmental protection into the law governing the conduct of hostilities and connects environmental harm with humanitarian consequences (Fleck, 2013; Henckaerts & Doswald-Beck, 2012; Ziaei Bigdeli, 2013b).

Despite their importance, these instruments face several interpretive and practical challenges. One of the most important difficulties concerns the interpretation of terms such as “widespread,” “long-term,” and “severe.” These terms establish a high threshold for prohibited environmental damage. While such thresholds may prevent trivial claims, they may also make it difficult to establish responsibility in cases where serious

environmental harm does not clearly satisfy all elements simultaneously. This problem is especially significant because environmental harm may be cumulative, delayed, or scientifically uncertain at the time of attack (Jalalian, 2015; Raei-Dehghi & Najafi, 2016; Saed, 2014). Another problem is the weakness of enforcement. Neither the ENMOD Convention nor Additional Protocol I provides a fully effective and independent enforcement mechanism capable of systematically investigating violations, assessing damage, attributing responsibility, and ensuring reparation. As a result, the effectiveness of these instruments often depends on political will, diplomatic pressure, or the existence of ad hoc mechanisms. This weakens the deterrent function of the rules and reduces their ability to guarantee equal accountability (Heydari & Abbasi, 2016; Jalalian, 2012; Omidy, 2012).

In addition to these treaty instruments, customary international humanitarian law also plays an important role in environmental protection. Customary rules may bind states regardless of treaty membership and may therefore help fill gaps in conventional law. However, the formation and identification of customary rules in this field remain contested, particularly with respect to the precise scope of environmental protection during armed conflict. The incomplete consolidation of some environmental norms as customary law is one of the reasons for the limited effectiveness of the current legal framework (Dixon, 2017; Henckaerts & Doswald-Beck, 2012; Ziaei Bigdeli, 2006).

7. Reparation for Environmental Damage in International Law

Reparation is one of the most important consequences of the international responsibility of states. When a state breaches its international obligations and thereby causes injury to another state or to interests protected by international law, it is required to make reparation. Reparation may take different forms, including restitution, compensation, satisfaction, rehabilitation, and guarantees of non-repetition. In environmental cases, the appropriate form of reparation depends on the nature of the damage, the possibility of restoration, the extent of harm, and the interests affected (Dixon, 2017; Gol, 2010; United Nations International Law, 2011).

In the field of environmental damage, reparation presents particular difficulties. The financial valuation of ecological harm is often complex because environmental resources may not have a clear market value. Damage to biodiversity, wetlands, forests, soil, groundwater, and ecosystem services cannot always be measured by ordinary economic standards. Moreover, some environmental damage may be irreversible, meaning that restitution in the strict sense is impossible. These difficulties, however, should not exempt the responsible state from liability. Rather, they require more sophisticated methods for assessing and compensating environmental harm (Bahrami Ahmadi & Alamkhani, 2013; Council of, 1993; Hawksworth & Bull, 2006).

Reparation for environmental damage should not be understood only as payment of money. In many cases, it must include restoration of damaged ecosystems, removal of pollutants, rehabilitation of affected areas, medical and social support for affected populations, long-term environmental monitoring, and institutional guarantees designed to prevent recurrence. This broader understanding of reparation is more consistent with the nature of environmental harm and the long-term interests protected by international environmental law (Kiss et al., 2000; Kulasooriya & Robinson, 2011; Pourhashemi & Arghand, 2013).

The principle of full reparation is particularly important in the context of armed conflict. If a state causes large-scale environmental damage through unlawful military conduct, limiting reparation to symbolic compensation would be insufficient. Full reparation requires that the responsible state bear the legal and financial consequences of its conduct to the greatest extent possible. This is necessary not only for justice in the specific case but also for deterrence in future conflicts (Ahmadinejad, 2012; Haddadi, 2010; Omidy, 2012).

Nevertheless, the practical enforcement of reparation for wartime environmental damage remains weak. The injured state may lack political power, evidence may be difficult to collect during or after hostilities, and international institutions may be unwilling or unable to act. These problems demonstrate that reparation is not merely a legal concept but also an institutional and political challenge. Strengthening the law of reparation therefore requires independent fact-finding, scientific assessment, transparent procedures, and legal mechanisms capable of operating without political selectivity.

8. Case Analysis: Iraq's War against Iran

Iraq's war against Iran is one of the examples in which extensive environmental damage occurred, yet such damage did not receive serious and effective attention at the international level. The war caused harm not only to military and civilian infrastructure but also to natural resources, oil facilities, agricultural lands, water systems, and the broader ecological environment. The environmental consequences of the conflict were connected to the use of destructive weapons, bombardment of infrastructure, contamination of natural resources, and damage to areas essential for civilian life and economic continuity (Bakhtiari Asl, 1997; Heydari & Abbasi, 2016; Rezaei, 1999).

The case is important because it shows that the existence of environmental harm does not automatically lead to international accountability. Despite the seriousness of the damage, no comprehensive international mechanism was established to identify, assess, and compensate the environmental losses suffered by Iran. This situation reflects a broader weakness in the international legal system: in the absence of an independent and binding mechanism, the application of state responsibility may depend on political considerations rather than the objective existence of legal injury (Heydari & Abbasi, 2016; Jalalian, 2015; Omidy, 2012).

The limited international response to environmental damage in this war also demonstrates the difficulty of documenting and proving ecological harm during prolonged conflicts. Environmental damage may appear gradually, and its full consequences may become visible only after the end of hostilities. Moreover, where conflict conditions prevent access to affected areas, the collection of evidence becomes extremely difficult. This evidentiary problem may weaken claims for responsibility even where serious harm has occurred (Bahrami Ahmadi & Alamkhani, 2013; Raei-Dehghi & Najafi, 2016; Raeisi, 2008).

From the perspective of international responsibility, the case raises questions concerning attribution, breach, causation, and reparation. If environmental harm results from military conduct attributable to a state and that conduct violates international obligations, responsibility should arise. However, the practical failure to activate responsibility in this case suggests that legal rules alone are insufficient. Without institutions capable of applying those rules, the injured state may be left without effective remedies (Dixon, 2017; Gol, 2010; United Nations International Law, 2011).

Thus, Iraq's war against Iran illustrates the gap between the normative framework of international law and its practical application. It shows that wartime environmental damage may remain uncompensated when there is no effective international will, no independent assessment mechanism, and no compulsory procedure for reparation. This case therefore supports the argument that the current system requires reform if it is to provide equal and effective protection.

9. Case Analysis: Iraq's War against Kuwait

A different situation was observed in Iraq's war against Kuwait. In that case, environmental damage resulting from the war was identified, assessed, and subjected to an international compensatory process. The destruction of oil facilities and the resulting environmental consequences were treated as compensable damage, and an international mechanism was used to require payment of compensation. This case demonstrates that when political will and institutional mechanisms exist, the identification and reparation of wartime environmental damage are legally and practically possible (Heydari & Abbasi, 2016; Jalalian, 2015; Omidy, 2012).

The importance of this case lies in its confirmation that environmental damage in armed conflict can be recognized as a legally relevant injury. It also shows that reparation for environmental harm need not be limited to direct economic losses. Environmental damage may include damage to natural resources, ecological systems, public health conditions, and the costs of environmental restoration. Therefore, the case provides an example of how the principle of state responsibility may be applied to environmental consequences of war (Bahrami Ahmadi & Alamkhani, 2013; Kiss et al., 2000; Pourhashemi & Arghand, 2013).

At the same time, the comparison between this case and Iraq's war against Iran reveals a serious problem of inconsistency. While environmental damage in the Kuwait case was recognized and compensated, comparable or serious damage in the Iran case did not receive the same level of institutional attention. This difference cannot be explained solely by legal criteria. It

suggests that the application of international responsibility may be influenced by political context, institutional design, and the balance of power within the international system (Ahmadinejad, 2012; Jalalian, 2012; Sharifi, 2009).

The Kuwait case also demonstrates the potential value of special mechanisms for claims assessment. Where a dedicated procedure exists, environmental damage can be documented, evaluated, and translated into compensatory obligations. This confirms that one of the main weaknesses in the current system is not the complete absence of legal principles but the absence of permanent and impartial mechanisms capable of implementing those principles in all comparable cases (Gol, 2010; Omidy, 2012; United Nations International Law, 2011).

Therefore, the lesson of Iraq's war against Kuwait is twofold. On the one hand, it proves that international responsibility for wartime environmental damage can be operationalized. On the other hand, its contrast with Iraq's war against Iran reveals that such operationalization has not yet become uniform, automatic, or legally neutral. This reinforces the need for reform in the enforcement mechanisms of international humanitarian and environmental law.

10. Evaluation of the Effectiveness of Existing Rules

The examination of relevant instruments and practical examples shows that the existing rules on environmental protection in armed conflicts are normatively significant but operationally insufficient. Instruments such as the ENMOD Convention and Additional Protocol I have contributed to the recognition of environmental protection as a legal concern in wartime. They have established important prohibitions and have influenced the development of legal discourse on the environmental limits of warfare. Nevertheless, their practical effectiveness remains limited by interpretive, institutional, and political weaknesses (Henckaerts & Doswald-Beck, 2012; Raei-Dehghi & Najafi, 2016; Saed, 2014).

One of the main weaknesses is the high threshold required for prohibited environmental damage. The requirement that damage be widespread, long-term, and severe may make it difficult to establish responsibility in many cases. Environmental damage may be serious even if it does not clearly satisfy all three criteria simultaneously. Moreover, because the full effects of environmental harm may become apparent only after a long period, immediate legal assessment may underestimate the gravity of the damage (Jalalian, 2015; Taghizadeh Ansari, 2016; Yousefi & Zandi, 2015).

Another weakness is the absence of a permanent and independent supervisory mechanism. In many cases, the identification of environmental damage depends on the initiative of states, international organizations, or ad hoc political arrangements. This creates inconsistency and selectivity. Without an independent mechanism for investigation, evidence collection, scientific evaluation, and legal attribution, it is difficult to ensure that all comparable cases are treated equally (Heydari & Abbasi, 2016; Jalalian, 2012; Omidy, 2012).

The difficulty of proving causation is also a major obstacle. Environmental damage may result from multiple causes, including direct attacks, indirect consequences of military operations, pre-existing environmental degradation, and post-conflict neglect. Establishing a causal link between a particular wrongful act and specific environmental harm may therefore be scientifically and legally complex. However, if evidentiary standards are applied too rigidly, responsible states may avoid liability despite causing serious harm (Bahrami Ahmadi & Alamkhani, 2013; Council of, 1993; Raeisi, 2008).

Political considerations further weaken the effectiveness of existing rules. The comparison between Iraq's war against Iran and Iraq's war against Kuwait shows that the application of responsibility has not always been guided by equal legal standards. This selectivity undermines confidence in international law and weakens its deterrent effect. For international responsibility to function effectively, it must be applied according to legal criteria rather than political convenience (Ahmadinejad, 2012; Haddadi, 2010; Sharifi, 2009).

Therefore, the main challenge in this field is the gap between the existence of rules and the enforcement of rules. International law has made important progress in recognizing environmental protection during armed conflict, but this progress remains incomplete unless it is accompanied by stronger implementation mechanisms. The effectiveness of the current system depends on developing clearer standards, strengthening customary rules, creating independent supervisory institutions, and ensuring full reparation for environmental damage.

11. Conclusion

The international responsibility of states arising from environmental obligations within the framework of international humanitarian law is one of the most important and challenging issues in contemporary international law. The environment may suffer severe, widespread, and long-lasting damage during armed conflicts, and such damage may affect human life, public health, civilian survival, and future generations beyond the time and place of war. For this reason, environmental protection in armed conflict must be regarded as an essential component of humanitarian protection and international accountability (Koivurova, 2015; Raei-Dehghi & Najafi, 2016; Taghizadeh Ansari, 2016).

The findings of the research show that although instruments such as the ENMOD Convention of 1976 and Additional Protocol I of 1977 provide important legal foundations for environmental protection during war, these rules are not sufficient in terms of enforcement and effective supervision. Their practical effect is weakened by the high threshold of prohibited harm, ambiguity in interpretation, lack of permanent monitoring mechanisms, difficulty in proving causation, and the incomplete consolidation of some environmental rules as customary international law (Henckaerts & Doswald-Beck, 2012; Jalalian, 2015; Sassoli et al., 2011).

The comparison between Iraq's war against Iran and Iraq's war against Kuwait also shows that the international responsibility of states for environmental damage has not always been applied uniformly and non-selectively. In one case, environmental damage did not receive effective international compensation, while in the other case, damage was identified and compensation was ordered. This difference demonstrates that the enforcement of state responsibility may be influenced by political considerations and institutional availability rather than solely by legal principle (Heydari & Abbasi, 2016; Jalalian, 2012; Omidy, 2012).

On this basis, several measures are necessary to strengthen the system of international responsibility of states in the field of wartime environmental protection.

First, the enforcement guarantees of rules protecting the environment in armed conflicts must be strengthened. Legal rules that lack enforcement mechanisms cannot provide effective protection in practice. Therefore, violations of environmental obligations during armed conflict must give rise to clear legal consequences, including cessation, non-repetition, restitution, compensation, and satisfaction (Dixon, 2017; Gol, 2010; United Nations International Law, 2011).

Second, an independent institution or mechanism should be established for the identification, assessment, and registration of wartime environmental damage. Such a mechanism should operate on the basis of scientific expertise, legal neutrality, and procedural transparency. It should be capable of documenting environmental damage during and after armed conflicts and providing reliable evidence for the invocation of state responsibility.

Third, violating states must be required to provide full reparation for environmental damage. Full reparation should not be limited to monetary compensation but should also include restoration of damaged ecosystems, removal of pollutants, rehabilitation of affected areas, long-term environmental monitoring, and guarantees of non-repetition. This approach is more consistent with the nature of environmental harm and the long-term interests protected by international law (Bahrami Ahmadi & Alamkhani, 2013; Kiss et al., 2000; Pourhashemi & Arghand, 2013).

Fourth, selective and political approaches to the application of international responsibility must be prevented. Similar cases of environmental damage should be assessed according to similar legal criteria. If the application of responsibility depends on political will, the equality of states before international law will be weakened and the deterrent function of the law will be undermined.

Fifth, customary rules prohibiting widespread, severe, and long-term destruction of the environment must be further developed and clarified. The strengthening of customary international humanitarian law can help fill treaty gaps and bind states even where treaty obligations are limited or contested (Dixon, 2017; Henckaerts & Doswald-Beck, 2012; Ziaei Bigdeli, 2006).

Sixth, cooperation among humanitarian, environmental, and international judicial institutions must be strengthened. Environmental protection in armed conflict cannot be achieved through a single branch of international law. It requires coordination between international humanitarian law, international environmental law, the law of state responsibility, and mechanisms of international dispute settlement.

Ultimately, effective protection of the environment in armed conflicts will be achieved only when existing rules move beyond the declaratory and theoretical level and are accompanied by real enforcement guarantees, independent supervision, scientific assessment, and equal application of international responsibility. The future development of international law in this field depends on transforming environmental protection from a general legal aspiration into an operational and enforceable obligation binding on all states.

Authors' Contributions

Authors contributed equally to this article.

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In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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