



Algeria's efforts to address climate change and protect aquatic ecosystems

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Abstract:

After the legislator confirmed that the state of the aquatic environment in Algeria requires intervention at the highest level to mitigate the risks and in adherence to the agreements signed by Algeria in this regard, a series of laws were enacted to ensure comprehensive protection of the aquatic environment from all pollution risks and the resulting climate changes. These laws were reinforced with strict sanctions to guarantee the achievement of this objective.

From this perspective, this research paper will address the concept of the aquatic environment and climate change (Section One), followed by a detailed discussion of Algeria's efforts in preserving the aquatic environment from climate change (Section Two).

Keywords: aquatic environnement, climate change, Algeria's Efforts

Introduction

Water is considered one of the primary blessings bestowed upon existence by Almighty God, it existed before the creation of the heavens and the earth, as mentioned in the Holy Qur'an. It is He who created the heavens and the earth in six days, and His Throne was upon the water, that He might test you [as to] which of you is best indeed. Surah Hud 7.

Water is the very essence of life, its foundation and its sustaining force, without which no human, animal, or plant can

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exist. God Almighty also said: "And Allah has created every [living] creature from water. Surah Al-Anbiya, 30

In his interaction with the environment, humanity has played a major role in disrupting the natural balance by excessively exploiting natural resources without adequately considering the damage inflicted on ecosystems and other living beings. As human activity, development, and territorial expansion—both on land and at sea—have intensified, so too has the pressure on water resources to meet growing needs. This increased exploitation has led to alarming levels of pollution, threatening the sustainability of this vital resource.

However, as industrial and technological advancement reached its peak, and human prosperity and economic growth flourished, the environmental dimension began to deteriorate. This decline was largely due to the discharge and dumping of the byproducts of development—such as industrial, agricultural, and urban waste—into rivers, oceans, and seas. These actions have significantly worsened the pollution of the aquatic environment.

Our country has suffered and continues to suffer from the pollution of the aquatic environment like all countries in the world, which has led to a growing environmental awareness that advocates for the need to preserve this important resource, the protection of which is linked to the continuity and stability of human life.

As a result, various countries have advocated for developing legal frameworks to safeguard aquatic environments from pollution. Numerous environmental scientists and lawyers have come together to support this cause, leading to the organization of many conferences aimed at discussing, diagnosing, and finding solutions to mitigate the risks of water



pollution. These efforts have culminated in a series of conventions that nations eagerly ratified. Algeria, along with other countries, has implemented legislative measures to manage and reduce aquatic pollution and regulate the use of water resources to prevent their depletion.

The issue of protecting the aquatic environment from pollution is of great importance in Algeria, particularly because it has a coastline extending over more than 1,200 km, which is exposed to intensive marine activities that significantly contribute to the pollution of its beaches. Moreover, the country possesses vast reserves of freshwater, both surface and groundwater, which are also threatened by pollution from extractive industries.

Considering the aforementioned, the following question arises: **What measures has the Algerian legislature implemented to safeguard the aquatic environment against the impacts of climate change?**

topic 1:The Nature of the Aquatic Environment and Its Relationship with Climate Change

We begin by clarifying the concept of the aquatic environment. Water plays a crucial role in the ecosystem and is fundamental to the survival of all living organisms.. The importance of water is further enhanced by the diversity of aquatic habitats it encompasses. Next, we will define climate change, which has emerged as one of the most pressing environmental issues, largely due to the increase in human activity and the excessive consumption of non-renewable energy sources. This has a direct impact on the aquatic environment and poses a significant threat to global security. Indeed, climate

change cannot be overlooked as environmental degradation continues unabated on a global scale. Our exploitation of natural resources is causing serious damage (Ibrahimi, 2023), Climate change is increasingly posing a threat to humanity akin to a war-like situation. (Defense, 2009)

The primary requirement: the definition of the aquatic environment

The concept of the aquatic environment refers to the inclusion of all water areas that form an integrated unit or interconnected and cohesive parts, whether these connections are natural or resulting from human intervention. (Ahmed Hamdaha, Volume 09, Issue 01 Algeria, 2020)

These environments are usually divided into two main sections: the freshwater environment, which is directly suitable for human consumption and covers only a limited percentage, estimated at about Two and a half percent of the Earth's surface The water cycle starts with evaporation, which results in the formation of clouds and eventually rainfall.

. Groundwater is considered one of the purest types of freshwater compared to surface water, making it the best option for various human uses due to its numerous sources and varying quality. In addition, surface freshwater exists in rivers and lakes. The second section is the saltwater environment, which constitutes about 97.5% of the total water on the planet and is distributed in oceans, seas, gulfs, sabkhas (salt flats), and estuaries. It can be utilized on a larger scale through desalination processes.

The aquatic environment is divided into two main environment

Section I: Freshwater



Fresh water is the water that is suitable for drinking humans, animals, and plants without causing them side effects, and the proportion of fresh water in the world is a small percentage compared to salt water, and with its scarcity, it is one of the most important natural resources in any country in the world, and how not and it is the main source of drinking and agriculture, without which there is no life for humans, animals and plants.

Freshwater sources are divided into surface water and ground water:

1- Surface water:

The majority of water comprises various water masses which include rivers, lakes, and ponds, and so it is in the form of running and static water, and running water is characterized by the fact that the water mass inside continuously moves in one direction, such as rivers and streams, While static surface water is characterized by the immobility of water for long periods of the year, in addition to this its movement is limited, because it is carried out by the wind or internal currents only, such as the water of lakes and swamps, and because of the effects to which we are exposed to its components, Freshwater ecosystems are subject to changes, as the color of its water changes, Less oxygen prevails there, resulting in a shortage of aquatic organisms that live in these bodies, and if the dumping of waste increases and silt accumulates, the lake begins to shrink into a pond and then gradually shrink with the increase in pollutants and lack of oxygen to turn into a swamp. (Al-Hawash, 2015)

2- Ground water:

Ground water is particularly important in dry areas where this water is the main source, especially in the process of industrial and agricultural development. It is water found

underground stored in various rocks, its main source is rainwater, river water and melted snow, after it seeps into the ground, where it collects and eventually settles in rocky layers permeable to water called groundwater reservoirs. (Al-Zouka, 1998)

This water has important characteristics as it is not affected by the drought conditions that occur in some regions of the world in limited periods of time, and it is free of impurities and pollutants that cause diseases, as it can be used in drinking, irrigation and industry without sometimes treating it. Ground water accounts for 92.9% of the world's total liquid freshwater. (Sabah, Issue 15, 2019)

Groundwater appears naturally on the surface of the earth in so-called springs. Springs usually form tributaries of valleys, rivers, lakes or swamps depending on the abundance of water from them. Shallow wells with a depth of no more than 30 meters are more susceptible to pollution and the amount of water extracted from them is small and greatly affected by the lack of rainfall, while deeper wells have safe water from pollution due to their distance from the surface, in addition to the abundance of water, as they are drilled in the case of major irrigation projects, or providing cities and villages with potable water. (KhermouchAsmahan, 2015)

Section tow: salt water

Salt water constitutes 71% of the total area of the globe, equivalent to 367.2 million square kilometers, and 97.2% of this water constitutes the seas and oceans. Seas are branches of the oceans and they penetrate significantly into land, and there is also a possibility that the quality of ocean water will vary.

The seas are classified according to their positions into marginal seas, which are located on the edges of the oceans and



are connected to them by wide openings, Continental seas like the Mediterranean Sea and the Red Sea connect to the oceans through narrow straits. In contrast, inland seas such as the Dead Sea are isolated within land and have no connection to other bodies of water. (Abdelmalek Ben Khalfallah, Protection of the Aquatic Environment from Pollution Risks in Algerian Legislation, 2020)

The oceans are vast areas connected by large openings and their temperature and salinity are almost the same.

The extent of the marine environment can be defined following the guidelines set by the 1982 United Nations Convention on the Law of the Sea, which include the following principles: (United Nations Convention on the Law of the Sea (1982) r. b., dated January 22, 1996, Official Gazette, Issue No. 06.)

the marine environment of the inland waters, the marine environment of the territorial sea, the marine environment of the contiguous zone, the exclusive economic zone, the marine environment of the continental shelf and the marine environment of the high seas. (Abdelmalek Ben Khalfallah, Protection of the Aquatic Environment from Pollution Risks in Algerian Legislation)

The second requirement:

The term climate change refers to the imbalances and significant and long-term changes that affect the average weather of a region, including rainfall, temperature and wind conditions, and the causes of this phenomenon are due to the Earth's dynamic processes, external forces or human activity. (Al-Agha, 2019 Volume 01, Issue 03)

Climate change is becoming more dangerous due to escalating human activities, especially by relying on well-known traditional fuels, and the slow shift to renewable sources as basic alternatives to sources producing gaseous pollutants, the more human activities, the greater the carbon dioxide pollution, and the more ferocious the phenomenon in its impact on the vital and environmental systems prevailing in the human planet, the distribution of energy on the surface of the earth governs the equation of the amount of energy reaching the earth from the sun versus the amount that leaves it as a surplus of need, the human activities above work This energy is distributed geographically throughout the earth by wind, sea waves and other related factors, especially gravity and some space relations with other planets such as the sun, the moon and others. (Dwivedi, 2020)

Climate change has emerged as one of the primary concerns globally, largely due to its direct impact on several crucial sectors, with agriculture being among the most significant.

water, energy, health and others, which made it receive wide attention by various international organizations and bodies concerned with the environment, and established convictions among climate scientists that these changes are the result of the intervention of human activity due to the gases that cause global warming - greenhouse gases - to the Earth's atmosphere, As a result of the use of fossil fuels for energy generation and use, forest burning, agricultural activities and land-use changes, the United Nations Framework Convention on Climate Change (UNFCCC) has defined in article I, second paragraph, the term climate change: (The United Nations Framework Convention on Climate Change (UNFCCC) was established following the 1992



United Nations Conference on Environment and Development in the Brazilian capital)

Climate change refers to alterations in the global atmosphere's composition that occur over comparable time periods, directly or indirectly due to human activity. This change adds to the natural variability of the climate system. (Ben AyadJalila, 2022 , Volume 12, Issue 01,)

In fact, a number of observations can be made with regard to this definition, contained in the aforementioned Convention, which can be summarized in the following points: (Nadia, 2022)

-This definition explicitly highlights the global nature of climate change, as its impacts are not confined to any specific geographic region but extend across the entire planet, affecting the composition of Earth's atmosphere as a whole. In this sense, climate change is no longer merely a local or regional environmental issue—it has evolved into a global challenge that demands a collective response from all of humanity.

It represents a shared dilemma that transcends political and economic boundaries, threatening food security, climate stability, human health, ecosystems, and even the future of upcoming generations.

Therefore, it has become essential to treat climate change as a global responsibility that requires international cooperation and coordinated efforts between both developed and developing countries, in order to devise effective and sustainable solutions that ensure the protection of the planet and the preservation of its environmental balance.

- This definition did not address the risks resulting from climate

change, nor its current and future effects on the environment and human health.

This could be because the initial paragraph of the article offers a distinct definition for "adverse effects of climate change." It states that this term refers to alterations in the natural or biological environment triggered by climate change, which result in significant negative impacts on the composition, resilience, or productivity of natural or functioning ecosystems, on the performance of socio-economic systems, or on human health and well-being.

This above-mentioned definition of climate change closely links current climate fluctuations with current climate fluctuations and human activity, considering the latter to be the main and even only cause of climate change, either directly or indirectly, thus limiting the causes of all climate change to artificial causes alone and not natural causes.

The Intergovernmental Panel on Climate Change (IPCC) defined it as "all forms of changes that can be expressed statistically and that can persist for decades on end resulting from human activity, or from the internal interactions of components of the climate system." (BousbaaïnTassadit, 2014)

It is indisputable that climate change has very serious effects on drinking water resources. The rapid melting of ice, along with significant changes in rainfall patterns—such as intense but infrequent rainfall events (as observed in many regions of Europe, Africa, and South America)—can directly disrupt hydrological systems and affect both the availability and quality of water resources. These climate-related shifts may, for example, lead to potable water scarcity in some regions, and poor water quality in others. (5th IPCC Report on Climate Change and Its Developments, Part 2: Impact, Adaptation, and Vulnerability, pp. 5-50.)



In other words, and in more scientific terms, climate change will lead to an increase in total precipitation and river flow in high latitudes, such as northern Europe and some tropical regions, while precipitation will decrease. At lower latitudes, particularly in the Mediterranean and the subtropics, rainfall is expected to increase, increasing the risk of flooding in parts of the world, while other regions will suffer longer, more severe and more frequent droughts. (Jean, 2008)

The second topic : Algeria's efforts to combat climate change and preserve the aquatic environment

Recognizing that the current state of the aquatic environment in Algeria calls for urgent intervention at the highest levels — both to address existing challenges and to uphold the international conventions to which Algeria is a signatory — the Algerian legislator has enacted a set of laws aimed at ensuring comprehensive protection of the aquatic environment from all forms of pollution. These legal measures are reinforced by deterrent sanctions designed to guarantee the achievement of this objective.

Section one: Protection of the aquatic environment in Algerian special texts

In this request, we will address the specific texts published by the Algerian legislator that deal with the protection of the aquatic environment against climate change.

1- Protection of the freshwater environment under the Water Code:

Pursuant to the provisions of the revised and supplemented Water Law No 05/12, the legislator devotes Part III of the law to the protection and sustainable management of water resources:

A-1 Quantitative protection of overexploited or threatened aquifers:

In regions where aquifers are overexploited or at risk of overexploitation, any activity involving the replacement or rehabilitation of existing irrigation infrastructure requires prior approval from the Directorate of Water Resources. Furthermore, the drilling of new wells or boreholes in these areas is strictly prohibited, and existing installations may not be modified in a way that increases water abstraction.

A-2: Specific Protection Zones

To prevent pollution, the law establishes the following specific protection zones:

- **Direct Protection Zone:** This applies to land owned by the State and is protected by a natural or legal person responsible for managing the relevant installation or structure.
- **Close Protection Zone:** This includes areas where discharges or installations that could cause permanent or sudden water pollution are either prohibited or strictly regulated.
- **Distance Protection Zone:** This includes areas where the discharges, activities, or structures mentioned above are monitored and controlled.

For the first time, an administrative body known as the "Water Police" has been established. Composed of agents from the Department of Water Resources, this body is tasked with protecting water resources from any form of violation. The Water Police are authorized to search for and inspect violations. As for penalties, Articles 166 to 179 of Law 12/05 impose heavy



finer, which can reach up to 1,000,000 Algerian dinars, as well as prison sentences of two months or more.

2-The safeguarding of freshwater ecosystems in accordance with legislation related to protected areas.

This law ensures the protection of wetlands from all types of degradation and identifies activities that could potentially harm them. The legislator also refers to these areas as "protected zones or areas," which include regions under the jurisdiction of one or more municipalities, or areas that are part of the public maritime domain, and are subject to specific regulations aimed at protecting fauna, flora, and terrestrial, marine, and coastal ecosystems. Article 02 of Law 11/02 of February 17, 2011

This law also grants the administration the authority to propose and designate any territory as a protected area, create plans for its management, and oversee its protection. To this end, penalties of imprisonment have been established for violations committed within any protected area, as outlined in the penal provisions of Chapter IV of the same Code

3-Protection of the aquatic environment under maritime law

The Algerian legislator has provided special protection to the marine environment in the Maritime Code, as reflected in the fifth paragraph, which outlines the pollution regulation system. It is prohibited to discharge, dump, or burn any substance into the sea that could:

- Harm public health and biological resources.
- Obstruct maritime activities, including navigation and fishing.
- Worsen the seawater quality regarding its usability.

- Diminish the recreational appeal of the sea.

4-Protection of the aquatic environment as outlined in the Law on Fisheries and Aquaculture.

The fisheries and aquaculture sector in Algeria is currently under considerable focus, driven by redevelopment initiatives that aim to highlight its economic importance and its role in the nation's broader economic progress. This is supported by Law No. 15-08, enacted on April 2, 2015, which amends and enhances the provisions of Law No. 01/11 from July 3, 2001., on fisheries and aquaculture, was enacted to provide legal protection for the aquatic environment. This law includes penalties for violations, prescribing a prison sentence of three to five years and/or a fine ranging from 500,000 to two million (2,000,000) Algerian dinars for anyone who intentionally possesses a fishing vessel or uses chemicals, explosives, including dynamite, poisonous baits, or electrocution methods, that are likely to weaken, destroy, damage, or contaminate biological resources and the aquatic environment. -Article 82 of Law 15/08 of April 2, 2015, amending and supplementing Law 01/11 of July-

Section tow: The need to mitigate the effects of climate change to preserve the aquatic environment

The world's nations have recognised the importance of technological cooperation to combat climate change and reduce greenhouse gas emissions. Although there have been earlier conferences, the momentous Kyoto Protocol was adopted in 1997, warning of unprecedented temperature rises and dire consequences.

To mitigate these effects, financial mechanisms have been developed to incentivise countries to fight climate change, such as carbon markets, carbon taxes, results-based financing, green bonds and international climate funds. These mechanisms aim to create economic incentives for the transition to a sustainable future.



1- Emissions trading mechanism:

The objective of the emissions trading mechanism is to encourage countries to reduce their emissions within their territories at the lowest possible cost. It also supports countries that face challenges in meeting their commitments by allowing them to benefit from the emission reduction efforts of others. This incentivizes developed countries to participate in the mechanism, enabling them to transfer emission allowances to other nations. From a legal perspective, it is the responsibility of the state to participate in emissions trading, thereby gaining economic benefits while contributing to the achievement of the Protocol's goal of reducing greenhouse gas emissions to protect the environment.

Article 17 of the Kyoto Protocol established the emissions trading mechanism but entrusted the Conference of the Parties with defining its operational principles, modalities, and rules. It also specified that this mechanism should complement the domestic actions taken by member states of the Global Environment Facility (GEF) to fulfil their emission reduction commitments.

The legal framework for the emissions trading process was finalized during the Bonn-Marrakech negotiations in 2001, with further implementation decisions made at the Conference of the Parties to the Kyoto Protocol in Montreal.

2- Joint implementation mechanism and clean development

In addition to the emissions trading mechanism, the Kyoto Protocol provided states with two additional tools, enabling them to implement projects in transition and developing countries to acquire emission reduction units.

2-1: Joint Implementation Mechanism:

The United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol created opportunities for collective action among countries to achieve the primary

objective of the Convention: stabilizing greenhouse gas concentrations at levels that are safe for both human health and the environment. To enhance cost-effectiveness, especially in developing countries, mechanisms were introduced to enable inter-country cooperation in climate efforts. Specifically, Article 6 of the Kyoto Protocol allows industrialized countries to meet their emission reduction targets by undertaking projects in other industrialized countries that are also Parties to the Protocol. The successful completion of these projects contributes to the overall reduction of global greenhouse gas emissions.

2-2 : Clean Development Mechanism

The idea of clean development gained prominence following the Kyoto Conference of the Parties in 1997 and was further refined during the Marrakech Conference. The Clean Development Mechanism (CDM) was established to create a conducive environment that supports developing countries in achieving sustainable development, while also promoting environmentally friendly investments that encourage social justice. At the same time, it helps industrialized nations fulfil their commitments under the Kyoto Protocol to reduce greenhouse gas emissions and mitigate the adverse effects of climate change. On a broader level, the CDM represents an ideal model that, if widely adopted, can pave the way for cleaner, fairer, and more sustainable global economic growth.

Formed according to Article 12 of the Kyoto Protocol, the Clean Development Mechanism aims to support non-Annex I countries, predominantly developing ones, in their pursuit of sustainable development. It seeks to aid in fulfilling the broader objectives of the United Nations Framework Convention on Climate Change (UNFCCC) while also assisting industrialized nations in reaching their emission reduction targets as specified in Article 3 of the Protocol.

Through this mechanism, developing countries benefit from projects initiated by industrialized nations. These projects



result in measurable emission reductions, which are then credited to the industrialized countries, supporting their efforts to meet Kyoto Protocol commitments. (Ben AyadJalila, 2022 , Volume 12, Issue 01,)

Conclusion:

The major environmental threats that the world is currently experiencing are no longer merely environmental issues, but have become a real threat to global security and stability. Chief among these threats is climate change, which has a direct and serious impact on ecosystems, especially the aquatic environment, whether in oceans, seas, rivers, or groundwater.

The rise in temperatures, changes in rainfall patterns, and the melting of polar ice all contribute to ecological imbalance, affecting biodiversity and threatening marine life and the ecosystems connected to it. Furthermore, the rising sea levels pose a direct risk to coastal areas and island nations, potentially leading to mass displacement of populations, which creates humanitarian crises and increases geopolitical tensions.

Therefore, climate change is not just an environmental threat; it is a traditional security threat in the broader sense. It endangers water and food resources, raises the likelihood of conflicts over resources, and destabilizes countries and societies. This puts it on the same level as well-known traditional threats such as wars and armed conflicts, and calls for a serious international response and cooperative efforts to confront it and mitigate its effects. For this we recommend the following:

- 1- Raise awareness of the environment among all members of society, especially those related to the aquatic environment.
- 2- Support and encourage environmental associations.
- 3 - Rehabilitation and training of administrative and police officers specialized in the surveillance and preservation of the

environment.

4. Helping developing countries reduce polluting climate emissions.

5- Encourage clean industry through the innovation of environmentally friendly factories and machines.

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