

Algeria and the Challenges of the Marine Environment: Towards Sustainable Development Under the Banner of Goal 14

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Received: 02/04/2024

Accepted: 22/05/2024

Published: 30/06/2024

Abstract:

In light of Algeria's distinctive coastal and Marine Environment (ME), which is rich in resources. However, there are significant challenges as a result of marine pollution, climate change and unsustainable exploitation. This study focuses on examining marine environmental challenges and efforts to achieve Sustainable Development Goal (SDG) 14: Life Below Water. The study aims to present the main environmental challenges facing the Algerian sea and coast, highlight the most important efforts made in environmental protection and coastal infrastructure development, and underscore opportunities for success in meeting these challenges. Among the results we found that there are significant environmental challenges, including marine pollution, declining water quality, and loss of biodiversity. Moreover, there are efforts being made by many stakeholders to protect the ME and achieve sustainable development goals. Finally, among the recommendations presented are strengthened international cooperation and exchange of knowledge and technology to achieve SDG14.

Keywords: Algeria, Biodiversity; Environmental Challenges; Marine Resources; Sustainable Development Goal 14.

Gel classification codes : O50; Q57; Q56; Q22; O13.

Introduction:

In general, Sustainable Development Goal 14 (SDG 14), which focuses on conserving oceans, seas, and marine resources sustainably, represents a crucial pillar for safeguarding Algeria's ME along the Mediterranean coast. This area holds strategic importance and boasts rich biological diversity, underscoring the significance of the marine ecosystem as a vital passageway for migrating species and contributing to regional environmental stability. Consequently, effective management of marine resources is not only a national necessity but also a regional responsibility. Within the broader context of sustainable development, the main challenge lies in identifying effective measures and policies to protect ME and ensure sustainable use of marine resources in Algeria.

In fact, the main difficulty lies in achieving a balance between the needs of economic development on the one hand, and the preservation of the ME and biodiversity on the other hand. This is done by reducing environmental degradation, treating pollution, and managing waste. Thus, the study raises the following questions: *How can Algeria mitigate threats to its ME and achieve a balance between sustainable use of marine resources and economic and social development needs? What are the appropriate strategies and tools to achieve this balance efficiently and effectively?* Regarding the study hypotheses: implementing effective policies and practices to conserve Algeria's ME is crucial for achieving SDG 14 by 2030, leading to progress in this area. Likewise, cooperative partnerships between government bodies, non-governmental organizations, local communities, and international collaboration are essential for addressing multifaceted challenges related to ME conservation and sustainable resource management.

Innovative technological solutions can play a significant role in enhancing Algeria's capacity to manage and protect its ME. To address these hypotheses, a mixed-method approach will be utilized. This involves employing descriptive methods to assess Algeria's environmental potential for sustainable development, including characteristics of the coastline and biodiversity. Documentary and analytical methods will be used, relying on annual sustainable development reports from the United Nations and specifically SDG 14 progress reports, along with analyzing reports and documents related to marine environmental development within Algeria's sustainable development framework. This study aims to achieve several objectives:

- Evaluate the current status of Algeria's marine ecosystems and human impacts along its coastline.
- Identify key challenges hindering the achievement of SDG 14 in Algeria.
- Explore potential strategies and interventions to enhance marine environmental conservation efforts and environmental management.
- Enhance comprehensive understanding of the interconnectedness between marine environmental conservation, social and economic development, and environmental sustainability within the Algerian context.

By clarifying the complexities surrounding the implementation of SDG 14 in Algeria and providing evidence-based recommendations, this research seeks to contribute to the global sustainable development agenda while enhancing aspirations for a prosperous maritime future.

1. Literature Review

In this context, we present the most important previous literature that our study intersects with, as follows:

- ([Molinet & Niklitschek, 2024](#), pp. 285–302) that revealed the overfishing pressures in the Patagonian fjords, amidst over 40,000 registered fishermen and large-scale official landings surpassing 200,000 tons in 2019, likely underreported. Management challenges encompass illegal fishing, underreporting, and regulatory weaknesses, leading to excessive exploitation of a few fish stocks. There's a call for a shift towards ecosystem-based fisheries management and the establishment of marine protected areas to address overexploitation and preserve biodiversity.
- ([Baker et al., 2023](#), pp. 1–14) emphasizes the vital role of ME in SDG 14, necessitating a balance among economic, social, and environmental aspects. In addition, the trade-off between achieving sustainable development goals and community well-being requires mechanisms to achieve fair results. In Seychelles, the expansion of marine protection harms the livelihoods of fishermen and artisans, through poverty, hunger and prosperity (SDGs 1, 2 and 3), highlighting the need for distributive and procedural justice for a sustainable future.
- ([Widayanti et al., 2022](#), pp. 1–9) demonstrates Indonesia's commitment to the Convention on Biological Diversity and highlights the challenges facing its implementation, particularly with regard to marine

conservation. Despite recognition of the importance of biodiversity and sustainable development, Indonesia lacks clear legal protection for marine and coastal areas. The study emphasizes that regulatory frameworks must prioritize protecting marine biodiversity and ensuring sustainable ecosystems. It also stresses the need to impose penalties on those who harm the ME, including administrative, criminal, or civil penalties.

- (Kirkfeldt & Frazão Santos, 2021, pp. 1–12) discussed the human pressures on ecosystems that hinder achieving Goal 14 on underwater sustainability. Marine spatial planning presents a potential solution, assessing its compatibility with the objectives of this objective. As well as its ability to mitigate the loss of biodiversity. Despite economic priorities in some cases, marine spatial planning shows promise in supporting UN SDG 14.
- (Ntona & Morgera, 2018, pp. 1–9) examined the links between SDG 14 (preserve oceans) and other goals, focusing on the role of ecosystem services. It is suggested that marine spatial planning guidance can be used through international frameworks such as the Convention on Biological Diversity to promote equitable benefit-sharing and manage conflicting stakeholder demands, with the aim of enhancing synergies between the SDGs.

This study seeks to expand understanding of the challenges facing the ME in Algeria. It also showcases key potential economic opportunities related to marine sustainability, such as marine tourism and sustainable fishing. In addition, it assesses Algeria's efforts in achieving Goal 14 of SD, also it identifies key policies and legislation related to the ME. Accordingly, recommendations are presented that can benefit local authorities in enhancing efforts to achieve the SDGs.

2. The Marine Environment (ME) (Concept – Ecosystem Services Benefits and Threats)

Given the importance of the ME to humans, other living organisms, and the planet as a whole, the concept of the ME will be addressed, and its importance derived from the benefits, or in other words, the benefits that are reaped now and in the future from marine ecosystem services, like that highlighting the threats that limit the effectiveness of the services provided,

as well as It harms the sustainability of marine resources. This is what motivates us to work to preserve this environment, as follows:

2.1. The Concept of the ME

The term ME includes the components, conditions, and physical, chemical, geological, and biological factors that interact and determine the productivity, condition, conditions, and quality of the marine ecosystem, the waters of the seas and oceans, the airspace above those waters, as well as the seafloor, ocean floor, and subsoil (Keast et al., 2023, p. 150).

Anyway, the ME consists of bodies of salt water that are naturally connected to each other. In addition to all of its bottom and subsoil, marine plant and animal organisms, natural resources that represent the components of marine life as an integrated marine system (Khaira, 2018, p. 378).

Thus, the ME is defined as that which includes a wide range of elements such as physical, chemical, geological, and biological factors that constitute marine resources. They all interact to affect the productivity, condition, and quality of the marine ecosystem. This environment includes the interconnected bodies of salt water of seas and oceans, the airspace above them, the bottom and the Earth's interior. This constitutes an integrated marine ecosystem.

2.2. The Marine Ecosystem (Definition – Importance - Services - Threats)

The marine ecosystem is important for the sustainability of life on this planet thanks to the services it provides. In this context, according to (Khera et al., 2015, p. 21) in 2005 the Millennium Ecosystem Assessment (MEA) defines these services as the benefits that people derive from ecosystems, either directly or indirectly. These benefits contribute to the overall well-being of human beings, including wealth, nutrition and security. Ecosystems provide diverse services such as provisioning, regulation, cultural services, and support. Furthermore, the MEA describes ecosystems as dynamic complexes of communities of plants, animals and microorganisms that interact with their non-living environment and perform functional roles. Biodiversity is also highlighted as critical to resilient ecosystems that support a wide range of functions. Additionally, (World Bank, 2012, p. 1)

defines ecosystem services as the benefits that individuals and companies derive from ecosystems. These services are classified into four types:

- a) *Provisioning services*: These include tangible products (goods) obtained by individuals from ecosystems.
- b) *Regulating services*: These are benefits derived from the regulation of *ecosystem processes*, which often require monitoring and management by individuals.
- c) *Cultural services*: These are non-material benefits individuals derive from ecosystems.
- d) *Supporting services*: These include natural processes that support other ecosystem services.

According to (Barbier, 2017, p. 2) the structure and functioning of marine ecosystems lead to the environmental production of ecosystem services. Some of these goods, services and cultural benefits directly affect human well-being, while others influence indirectly by supporting or protecting valuable economic assets and productive activities. In the same context, (Geta, 2022, p. 1) emphasizes that the ME hosts diverse ecosystems of great importance for biodiversity in coastal and open ocean habitats. These ecosystems provide vital resources for society, as a large portion of the world's population depends on them for survival and well-being. However, human activities such as land use changes, overfishing, climate change, and the introduction of alien species pose threats to marine biodiversity, increasing pressure on these ecosystems. As environmental conditions change, species must adapt. Furthermore, (Ministry for the Environment & Stats NZ, 2022, pp. 6-8; OECD, 2016, p. 3) ,point out that the ME faces many persistent and cumulative pressures. Human-caused greenhouse gas emissions contribute to rising ocean acidity, sea levels, and temperatures. Land-based activities also cause further damage to marine ecosystems through pollution from sediments, nutrients and plastics. At sea, pressures stem from commercial and recreational fishing, aquaculture, resource extraction, the introduction of non-native species, and coastal development. These pressures are expected to intensify as ocean industries expand, exacerbating the challenges faced by marine ecosystems.

In summary, [Table 1](#) shows the various threats facing the ME.

Table 1: Threats facing the ME

Threat	Description
Climate Change	Climate change amplifies threats to marine ecosystems, resulting in habitat loss, species shifts, and coral bleaching. Rising temperatures, ocean acidification, and storms lead to coral reef destruction, with projected extinctions and loss of biodiversity by 2050, disrupting essential services provided by marine life.
Pollution from Human Activities on Land and Sea	Marine pollution, mainly from land-based sources, introduces harmful substances into oceans, including plastic waste and various pollutants like chemicals and sewage. Plastic waste, with its slow decomposition, spreads microplastics widely. Other pollutants contribute to ocean acidification and eutrophication, posing significant risks to marine ecosystems.
Overfishing, Unsustainable Exploitation, and Habitat Destruction	Commercial fishing, using methods such as deep-sea trawling, longlines, set nets, dynamite fishing and aquaculture, poses serious threats to marine species, habitats and ecosystem health.
Continuous Introduction of Non-native Species	Alien organisms have severe environmental impacts, disrupting ecosystems, causing extinctions, degrading water quality, increasing competition, and spreading diseases.

Source. Prepared by researchers based on

- Ministry for the Environment & Stats NZ. (2022). New Zealand's Environmental Reporting Series: Our marine. environment 2022. PP: 6-8 Retrieved from: <https://environment.govt.nz/>
- OECD. (2016). Marine Protected Areas: Economics, Management and Policy Mixes, Policy Highlights P:3 <https://www.oecd.org/environment/resources/Marine-Protected-Areas-Policy-Highlights.pdf>

3. Target of SDG14: Life Below Water

According to ([European Commission, 2023](#)), Goal 14 of the SDGs comprises 10 targets and 10 indicators. It covers measures to combat marine pollution (14.1, 14.3), sustainable management and protection of marine and coastal ecosystems (14.2, 14.5), regulation of fishing practices (14.4, 14.6), and the economic benefits of sustainable use of marine resources (14.7). Implementation indicators focus on increasing knowledge, research, and technology to improve ocean health and marine biodiversity (14.a), ensuring rights and access for small-scale fishers to marine resources and markets (14.b), and enhancing the conservation and sustainable use of oceans (14.c).

4. Protecting the ME in Algeria: Challenges and Efforts

4.1. The ME in Algeria: Coastal Richness and Biodiversity

According to (Algeria, 2017; Ministry of the Environment and Renewable Energies, 2022b), Algeria is located in the northern part of Africa, a maritime coastal country overlooking the Mediterranean Sea and the cradle of many civilizations. The Mediterranean, or mare nostrum, has, in fact, always been a bridge linking the shores of Africa, Asia, and Europe. With its 1,622 km of coastline, which includes 32 islands, 208 islets, and 71 marine and coastal areas of ecological interest to protect, including "26 marine areas with remarkable species, 26 areas with vermet sidewalks, 19 Posidonia areas, as well as 26 wetlands and 2 wetland complexes," Algeria has a coastline rich in diverse and remarkable natural heritage and potential linked to significant socio-economic development.

4.2. The Threats Facing the ME in Algeria

In this framework, (Ministry of spatial planning and environment, 2014, pp. 51–55) noted that the marine ecosystem is still relatively unknown in Algeria, while it constitutes a reservoir of rich biodiversity, which is exposed to many threats, which are presented in Table 2.

Table 2: The various Threats Facing the ME in Algeria

Varieties and Description of Threats	
i) The Destruction of Habitats:	The Algerian coast is facing great challenges due to urbanization, industrialization and agricultural expansion, which leads to habitat destruction and encroachment on agricultural land. They include the main issues:
i) Urban planning in coastal areas.:	Unregulated urbanization and industry along the Algerian coast, leading to the degradation of Sandy vegetation and non-compliance with the laws on the protection of the coast.
ii) Clearing for Agricultural Purposes:	Expansion of agricultural domain resulting in the clearance of original vegetation, contributing to habitat destruction.
iii) The Extraction of aggregates:	Marine aggregate extraction, notably beach sand, harming beach invertebrates and altering sediment dynamics, impacting biodiversity and risking habitat loss.
iv) The Trampling of Vacationers:	Tourist activities such as trampling altering coastal terraces and recreational fishing, alongside intensified underwater fishing and poaching.
v) Trawling:	Illegal trawling damaging sensitive habitats like seagrass meadows, disrupting biodiversity and food chains in the Mediterranean.
vi) Dredging Sediment Discharges:	Dredging activities generating sediment laden with pollutants, posing a significant threat to habitat destruction and biodiversity through disposal onto unpolluted seabeds.

Varieties and Description of Threats	
II)	Pollution: There are several types of pollution. Among them, those due to wastewater that flows directly into the sea. Those relating to industrial units which also reject part of the totality of their waste at sea and finally that of the boats themselves, through the ballast releases.
i)	Domestic Pollution: Urban wastewater releases large amounts of organic matter and nutrients, which leads to overfeeding and degradation of the environment. These waters cause environmental disturbances that affect marine life and the environment, transmit chemical pollutants and pathogenic germs. These pollutants have contributed to a negative impact on marine organisms, as has happened in some marine areas in Algeria.
ii)	Industrial Pollution: Hydrocarbon pollution arises from industrial activities such as storage, transportation and refining, causing harmful substances to leak into the water. Industrial units located on the coasts use sea water to cool their equipment, which leads to the release of hot water into the sea. Marine traffic also causes noise that affects marine life and disturbs whales. Industrial activities affect the biodiversity of marine surfaces, require environmental improvements and efforts to minimize harmful effects.
iii)	Pollution by boats: is caused by decompression processes and leaks during loading of tankers, and it represents a threat to the biodiversity of the Algerian coasts due to the fact that Algeria is an exporter of crude hydrocarbons and the presence of intensive maritime traffic. The cracking of pipes or the sinking of oil tankers may cause major accidents that threaten the ME.
iv)	Agricultural pollution: It contributes to marine pollution through the use of fertilizers and pesticides, which leads to their leakage into marine waters. The government has set up sewage treatment plants to improve water quality. The proliferation of some species of microalgae can be an indicator of pollution, as it usually indicates the presence of excess nutrition in marine waters.
III)	The pressures on fisheries resources in Algeria: Due to overexploitation and the use of harmful fishing techniques, threaten marine biodiversity. Fishing professionals point to climate change as a factor, although its impact remains uncertain. The use of unconventional devices, such as dynamite, also contributes to the deterioration of crucial marine habitats.
IV)	The effects of climate change :There are debates about marine ecosystems, because the origin of water temperature variations remains uncertain, which may result from human activity or natural climatic phenomena. Plankton are the first to be affected by warming, while hard-bottom species are sensitive to temperature variations and salt discharges, threatening their habitat in the eastern area from Algiers Bay to Wadi Reghaïa. i) Planktonic Indicators: Plankton is a sensitive indicator of global warming, influencing its population and biodiversity according to temperature and current variations. Dinoflagellates producing biotoxins and weakened ecosystems are particularly

Varieties and Description of Threats
vulnerable to climate change, with reduced adaptive capacities.
ii) Zoological indicators (invertebrates): The first observation of a tropical invertebrate in Algeria concerns <i>Oculina patagonica</i> , a hexacorallary of the <i>Oculinidae</i> family, reported from the Habibas Islands in 2007. This species, potentially invasive, suggests a warming of the waters, although its introduction may also be linked to other factors such as unpacking. A second observation was reported in the marine area of El Kala, where <i>Oculina patagonica</i> coexists with <i>Astroides Calycularis</i> .
V) Invasive Species: Invasive species represent a pernicious threat, difficult to anticipate, with effects still poorly known on ecosystems. Examples include <i>Oculina patagonica</i> , reported in 2007 from the Habibas Islands, and <i>Pinctada radiata</i> , a pearl oyster introduced to the Mediterranean in 1874. The proliferation of exogenous species, such as <i>Caulerpa taxifolia</i> and <i>Caulerpa racemosa</i> , as well as fish such as the flute fish (<i>Fistularia commersonii</i>), are major natural threats to Algerian coastal ecosystems.
VI) Aquaculture: by some of its aspects constitutes a threat to the biodiversity of the soft bottoms. The development of new aquaculture activities concerning non-Mediterranean species is a threat to genetically very close autochthonous species.

Source: Ministry of spatial planning and environment. (2014). 5th National Report ON THE IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY AT NATIONAL LEVEL (In French).

<https://www.cbd.int/doc/world/dz/dz-nr-05-fr.pdf>

4.3. Assessment of Algeria's efforts to achieve the SDG14

According to (Sachs et al., 2023, pp. 126–127), the table in the appendix presents various indicators to measure progress towards SDG 14, with corresponding values and years for those indicators. The icons show the trends for each indicator, where the arrow indicates the trend (stable, increasing, descending) and the circle indicates no change or inapplicable data. Details of the information provided are presented below:

- Average protected area at marine sites important for biodiversity (%): 74.5 (2022) - stability of the protected area.
- Ocean health index: clean water score (0-100, where 100 is best): 45.7 (2022) - stability in water quality.
- Fish caught from overexploited or depleted stocks (% of the total catch): 19.6 (2018) - an increase in the percentage of overfishing.
- Fish caught by trawling or dredging (%): 21.9 (2019) : decrease in trawling catch.
- Caught fish that are subsequently discarded (%): 12.9 (2019) - stabilization of the catch disposal rate.
- Threats to marine biodiversity embodied in imports (per million

inhabitants): 0.0 (2018) - no recorded threats.

These data provide a comprehensive overview of the state of marine biodiversity and the sustainability of fishing practices. Different trends in the indicators show opportunities and challenges that can help to understand what actions are necessary to protect marine life.

4.4. Algeria's Efforts to Protect the ME

Algeria's geostrategic location on the Mediterranean coast has imposed on the authorities and stakeholders the obligation to protect and preserve its environmental wealth. The most important efforts are as follows:

a) Environmental legislation and official institutions:

Algeria has adopted strong environmental legislation, the implementation of which is supervised and monitored by government institutions such as the Ministry of Environment and renewable energy and the Ministry of Fisheries. (See [Table 3](#)).

Table 3: The most important legislation that serves the protection of the ME in Algeria

Legislation and Purpose
Law No. 02-02 dated 22 Dhu al-Qa'da 1422 corresponding to February 5, 2002, concerning the protection and valuation of the coast. (Ministry of the Environment and Renewable Energies, 2022b) (The Official Gazette of the Algerian Republic, 2002, pp. 24–30). Article 2: Within the meaning of this law, which concerns the protection and strengthening of the coastline, the coastline includes all islands, islets, the continental shelf, as well as a strip of land with a width of at least eight hundred meters (800 meters), along the sea including: - The slopes of hills and mountains, visible from the sea and not separated from the shore by a coastal plain. - Coastal plains at a depth of less than (3km) from the top of the sea water. - The totality of forest massifs. And agricultural land. - The totality of wetlands and its beaches, part of which is located in the coast from the highest sea waters as defined above. - Sites of a natural, cultural or historical nature. Article 7: In accordance with this law, the coast includes all islands, small areas, water plains, mountain slopes visible from the sea and which are not separated from the coast by a coastal plain; it also includes coastal plains with a depth of three kilometers (13km) from the highest sea water level, includes all forests and agricultural lands as well as wet areas and their beaches that are partially located in the coast from the highest sea water level as defined above, and includes sites that have a landscape, cultural or historical character. Article 8: The coast, in accordance with article v above, is subject to general measures of protection and development contained in this law, and includes a specific area subject to protection and development measures, called the coastal zone, which includes the natural

Legislation and Purpose
Shore, Islands, Marine inland water areas, soil and subsoil of territorial waters
Law No. 10-03 of the 19th of the first Jumada of the year 1424 corresponding to the 19th of July 2003 concerning the protection of the environment in the framework of sustainable development. (The Official Gazette of the Algerian Republic, 2003, pp. 6–22) Chapter III: requirements for the protection of waters and aquatic environments; Part II: protection of the sea; Article 52: - Subject to the applicable legislative provisions related to the protection of the ME, it is prohibited within - Marine waters subject to Algerian jurisdiction, each pouring, immersion or incineration of substances that: - Damage to public health and marine ecosystems. - Obstructing marine activities, including salinity, aquaculture and marine fishing. - Spoiling the quality of marine water in terms of its use. - Reducing the recreational and aesthetic value of the sea and coastal areas, and compromising their tourism capabilities. The list of substances listed in this article is determined by regulation.
Executive Decree No. 2009-88 dated 21 Safar 1430 corresponding to February 17, 2009, concerning the classification of threatened areas of the coast. (The Official Gazette of the Algerian Republic, 2009, pp. 8–9) - Defining the coastal space. - Ecological, breeding and geomorphological characteristics. And wave study. - Sediment diameter measurement study. Shoreline Dynamics. - Degradation stressors and causes. In addition to Vulnerability assessment - Suggestions for precautions aimed at protecting the area - Proposals for classification as a threatened area.
Executive Decree No. 10-31 of 5 Safar 1431 corresponding to January 21, 2010, setting out the modalities for extending the protection of coastal seabeds and determining offshore industrial activities. (The Official Gazette of the Algerian Republic, 2010, pp. 12–13) Article 1: This decree aims to: - Extend the ban on the extraction of underwater substances abroad beyond the limit of twenty-five (25) meters. - Identification of industrial activities abroad
Article 5: To protect marine ecosystems and the unique features they contain, only marine industrial activities that do not harm the ME or natural balances may be authorized.
Executive Decree No. 264-14 dated 27 Dhu al-Qi'dah 1435 corresponding to September 22, 2014, relates to the regulation of combating marine pollution and the establishment of emergency plans for this purpose. (The Official Gazette of the Algerian Republic, 2014, pp. 9–15) Article 1: This decree aims to regulate the combating of marine pollution resulting from maritime, land, or aerial accidents that cause or may cause a significant and/or imminent leakage of hydrocarbons or any other products or substances that may pose a serious and/or imminent threat or cause damage to MEs, sea depths, coastal areas, and associated ecosystems.
Law No. 08-15 dated 12 Jumada Al-Thani 1436 AH, corresponding to April 2, 2015,

Legislation and Purpose
amends and complements Law No. 11-01 dated 11 Rabi' Al-Thani 1422 AH, corresponding to July 3, 2001, concerning maritime fishing and aquaculture. (The Official Gazette of the Algerian Republic, 2015, pp. 9–16). Article 3: The utilization of marine biological resources within national jurisdiction and their conservation are based on: - Responsible marine fishing to ensure the preservation and sustainable management of biological resources. - Establishing prepared fish stocks to enhance the diversity and availability of biological resources, ensuring that fishing efforts are proportional to the production capacity of these resources and their sustainable use. - Researching and collecting data to enhance scientific and technical knowledge about fish stocks. - Coordinating monitoring activities with relevant authorities to ensure that fishing activities do not adversely affect biological resources and their habitats. - Involving industry professionals in shaping policies related to marine fishing, aquaculture, and the implementation tools. The implementation mechanisms of these measures are specified as needed through regulation.

Source: Prepared by the authors

b) Establishment of Marine Protected Areas (MPAs)

According to ([OECD, 2016](#), p. 5) Marine Protected Areas (MPAs) are clearly defined in terms of their geography, being spaces that are recognized, allocated and effectively managed, both through legislation and by other means, with the aim of preserving biological and environmental diversity in the long term, promoting ecological services and related cultural values. ([Boukeltoum & GUEDRI, 2024](#), pp. 993–994) confirm that Marine Protected Areas are considered not only a boon for the fishing industry, but also for tourism, as they have an immediate economic impact. They are a means of enhancing marine resources and achieving food security, as the protection of marine habitats and biodiversity and the promotion of viable fisheries are one of the main objectives of the establishment of these protected areas. According to ([Marine Conservation Institute, 2024](#)) Algeria has 06 Marine Protected Areas and 04 Managed Marine Areas (See [Table 4](#)), Marine Protected Areas in Algeria have been implemented by only 0.02%, and their area is 29.6 km², while the total marine property in the country is 131,185.8 km², and it includes the exclusive economic zone including the territories.

Table 4: Marine Protected Areas and Managed Marine Areas of Algeria

Marine Protected Areas	Marine Managed Areas
- Banc des Kabyles Marine Reserve (Réserve Marine) - Banc Des Kabyles Marine Reserve Specially Protected Areas of Mediterranean Importance (Barcelona Convention) - Gouraya National Park (Parc National) - Les îles Habibas Specially Protected Areas of Mediterranean Importance (Barcelona Convention) - Reserve Naturelle de Cap Lindles Nature Reserve (Reserve Naturelle) - Réserve Naturelle Marine des Iles Habibas Marine Nature Reserve (Réserve Naturelle Marine)	- El Kala UNESCO-MAB Biosphere Reserve - Île de Rachgoun Ramsar Site, Wetland of International Importance - Marais de la Mekhada Ramsar Site, Wetland of International Importance - Taza National Park (Parc National)

Source: Marine Conservation Institute. (2024). MPAtlas: Algeria. <https://old.mpatlas.org/region/country/DZA/> (Accessed in 10 March 2024)

c) International cooperation in the field of protection of the ME:

According to (Ministry of the Environment and Renewable Energies, 2022c; Ramsar Convention on Wetlands, 2024; The Convention on Biological Diversity, 2012; UNEP, 2024) Algeria adopts an effective strategy for the protection of the Marine and coastal environment, working in close cooperation with international and regional bodies. These efforts are demonstrated by its participation in global conventions such as the Barcelona Convention, the convention on Biological Diversity and the Ramsar Convention on wetlands, in addition to its participation in programs such as the United Nations Environment Program, reflecting its commitment to achieving sustainable development and protecting environmental resources in the region (See Table 5).

Table 5: Agreements on international cooperation in the field of ME protection in Algeria

Cooperation Agreement and Purpose
United Nations Environment Program; The agreement aims to identify key areas of cooperation between the parties, focusing on integrated waste management, conservation of Natural Resources and ecosystems, as well as support for the green economy. The memorandum includes combating climate change and desertification, developing renewable energies, and enhancing the capabilities of negotiators in the implementation of international agreements and charters.

Cooperation Agreement and Purpose

International Union for the conservation of nature: In 2019, an agreement was signed between the IUCN and the Ministry of environment, aimed at strengthening and developing the national network of protected areas, especially those associated with marine areas. Cooperation is focused on the promotion of ecotourism, the protection of Threatened Species, the promotion of natural solutions to combat climate change.

GIZ German agency for international cooperation: Algeria and Germany maintain long-term cooperation relations, as development cooperation has been active in Algeria since the seventies and continues to this day. GIZ works in Algeria on behalf of the German Federal Ministry for Economic Cooperation and development (BMZ) to implement development projects and initiatives. Among the most important agreements: protection of the environment and the biodiversity of the Algerian coast (PEBLA): protection of the environment and biodiversity of the Algerian coast.

The Ramsar Convention on wetlands: The Wetlands Convention is the most important framework for intergovernmental cooperation on wetlands issues. The number of sites or wetlands in Algeria under the Ramsar Convention for the conservation and protection of wetlands is 50 sites, and the first place is occupied by Africa, divided into beaches, oases, rivers, caves, Gorges, swamps, lakes and forests.

Barcelona Convention for the protection of the Mediterranean Sea from pollution

Environmental and development priorities in the National Policy ensure the assessment, prevention and reduction of pollution, along with the preservation of nature, landscapes and sites of environmental and cultural value. It also aims to raise public awareness of the threats facing the Mediterranean and to include the public in conservation and treatment efforts.

The Convention on Biological Diversity (CBD): It has three main goals, which are the conservation of Biological Diversity, the sustainable use of its components, as well as the fair and equitable sharing of benefits arising from the use of genetic resources.

Source: Prepared by the authors, based on ([Ministry of the Environment and Renewable Energies, 2022c](#); [Ramsar Convention on Wetlands, 2024](#); [The Convention on Biological Diversity, 2012](#); [UNEP, 2024](#))

d) Environmental awareness and education regarding the ME

According to ([Ministry of the Environment and Renewable Energies, 2022a](#)) Algeria continues to strengthen its efforts in the field of environmental awareness and education, especially when it comes to preserving the ME. The Algerian government has taken a series of measures aimed at sensitizing citizens to the importance of the oceans and seas, the need to preserve them and preserve the biodiversity they contain. Algeria's efforts in this area include launching awareness and educational campaigns aimed at the public to highlight the challenges facing the ME, such as

marine pollution, illegal fishing and the effects of climate change. Algeria also organizes various awareness-raising events such as workshops, seminars and lectures aimed at the local public, especially young people, to raise awareness of the importance of preserving the ME.

e) National-Level Partnerships for Environmental Protection

([Ministry of the Environment and Renewable Energies, 2022d](#)) is keen to strengthen the role of civil society as a key partner, and updates the list of associations working in the field of Environment periodically to direct their work towards the ministry's vision. The ministry also plans to develop a digital platform that will highlight the work of associations and facilitate the exchange between them. The ministry follows up on the implementation of projects of associations benefiting from foreign funding, and signs partnership agreements with other ministerial sectors to implement joint activities to protect the environment and achieve the previously set goals (See [Table 6](#)).

Table 6 : National-Level Partnerships for Environmental

Partner and Purpose
The Ministry of National Education: to promote environmental education: for sustainable development in the educational environment.
The Ministry of Justice: for the social reintegration of prisoners.
The Ministry of Communication: to train journalists in the field of Environment
The Ministry of Housing, Urbanization and the City : to implement the roadmap: for improving the living framework at the level of urban neighborhoods and new cities.
The Ministry of Vocational Training and Education: to promote vocational training and education in the developed professions related to the environment.
The Ministry of Tourism and Traditional Industries: to promote ecotourism.
The Ministry of Higher Education and Scientific Research: for the implementation of educational and scientific research programs in the field of Environmental Protection and sustainable development.
The Ministry of Fisheries and Fishing Resources: to improve and strengthen the quality control of aquatic environments and their good ecological condition, to preserve marine and coastal aquatic ecosystems and exploit their biological resources in a sustainable manner.

Source: Prepared by the authors, based on ([Ministry of the Environment and Renewable Energies, 2022d](#))

5. Conclusion and Recommendations

In conclusion, the ME is a vital basis for ecological balance, providing vital services for the conservation of biodiversity and environmental sustainability. Exposed to threats such as pollution and overexploitation, the need to preserve this precious ecosystem is urgent. The research highlights the importance of SDG 14 in protecting underwater life in Algeria, and emphasizes the need for International Cooperation and strengthening environmental policies to achieve this goal and ensure the sustainability of the ME for current and future generations. At the end, we list the most important recommendations:

- **Strengthening environmental legislation:** developing and implementing strict environmental laws that protect the ME and ensure compliance with them.
- **Strengthening international cooperation:** cooperation with the international community to exchange knowledge and successful experiences in the field of marine conservation.
- **Scientific research development:** support scientific and technological research to better understand the effects of climate change on the ME.
- **Promoting environmental awareness:** launching awareness and educational campaigns for the community about the importance of preserving the ME and their responsibility in this.
- **Promotion of research and development:** investments in research and development to develop new technologies for monitoring the ME.
- **Promoting environmental education:** integrating educational materials on the ME into education curricula to raise awareness among young people.
- **Development of national strategies:** development of comprehensive national strategies to protect the ME and achievement of the SDG14.
- **Encouraging innovation:** encouraging innovation in the field of marine research and developing innovative solutions to environmental challenges.
- **Enhance funding:** increase investment in marine conservation projects through local and international funding.
- **Strengthening sectoral partnerships:** building effective partnerships between the government, private sectors and civil society to enhance

marine conservation efforts.

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