



The blue economy as a strategic option to promoting sustainable development in Algeria outside the hydrocarbon sector- Marine fishing and aquaculture as a model-

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Abstract

This research aims to show the importance of the blue economy in embodying the path of sustainable development outside the hydrocarbon sector based on several activities related to oceans, seas and coasts. This research is also unique in highlighting Algeria's experience in the field of containing sustainable blue economy applications in the sector of marine fishing and aquaculture as a model, in addition to presenting the reliable national strategy of blue economy for 2030.

Finally, we concluded that Algeria felt the need to move towards an effective and renewable alternative to oil based on investment in the sectors of the blue economy, and it made huge investments for this, especially in marine fishing and aquaculture, which enhances Algeria's economic, social and environmental sustainability.
Key words: Blue Economy; Sustainable Development; Sustainable Blue Economy; Algeria.

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1. INTRODUCTION

In recent years, the international community has acknowledged the significance that the Blue Economy has gained as a catalyst for sustainable growth. The adopted practices in the realms of production and consumption, devoid of the necessary sustainability, have resulted in the excessive exploitation of available terrestrial resources, and even their depletion. This has compelled coastal nations to shift towards marine resources, presenting significant opportunities to spur economic growth and ensure social well-being, all while guaranteeing environmental protection.

From this perspective, the notion of the blue economy has arisen and established itself as a pivotal factor for shaping policies that support food security, poverty alleviation, and the sustainable management of water resources. Taking into account the strategic coastal breadth of Algeria, it is essential for the nation to implement measures that capitalize on its blue economy, with a particular focus on expanding initiatives, particularly in marine fishing and aquaculture. This effort aims to bolster the trajectory of sustainable development within the country.

Drawing upon the aforementioned, the primary focus of this research is to address the following core issue:

How can the blue economy serve as a strategic option for sustainable development beyond the hydrocarbon sector in Algeria, particularly in the realms of marine fishing and aquaculture?

The objective of this study is to highlight the significance of the blue economy as a viable alternative for sustaining nations beyond reliance on hydrocarbons, particularly in Algeria. It yields abundant wealth through the strategic investment in water resources. As a preliminary response to the problem, we have formulated the following hypotheses:

The first hypothesis: The blue economy represents one of the fundamental solutions that can be adopted in Algeria to propel the trajectory of sustainable development.

The second hypothesis: The blue economy enables Algeria to improve its economic performance, moving away from non-renewable energies which pose a threat to the environment and erode the rights of future generations.

The third hypothesis: Algeria has succeeded in establishing the foundations of the blue economy within the sectors of marine fishing and aquaculture.

Various research papers on the subject of the blue economy have been examined, considering the specific relevance to the study's objectives and the particularities of the study samples. We will solely point out the most important of these studies as follows:

- **The study by Abdelhafid Meskine and Rima Zerkout (2019) entitled: "The Shift Towards the Blue Economy and its Implications for Sustainable Development."**

The primary objective of this study is to highlight the importance of the blue economy as a global developmental trend. This is accomplished by providing insight into the theoretical context of the blue economy and sustainable development. The study's findings indicate that the blue economy plays a pivotal role in advancing the goals of global sustainable development, particularly through the sustainable utilization of aquatic resources. Consequently, it contributes to the equitable distribution of wealth across generations, ensuring human well-being. In conclusion, the study proposes recommendations to foster public awareness of the importance of international collaboration in the sustainable use of aquatic resources, emphasizing a sustainable perspective over a purely competitive market-oriented approach among global investors.

- **The research conducted by Sofiane Gibran and Imane Kellal (2018) under**

the title: “The Role of the Blue Economy in Achieving Environmental and Economic Sustainability in Mediterranean Countries.”

The researchers in this study sought to highlight the extent to which Mediterranean countries rely on the blue economy to drive their shift towards a sustainable economy based on maritime resources. This is particularly significant given that the Mediterranean Sea region stands as one of the world’s most significant biodiversity hubs, housing diverse coastal and marine ecosystems. The study’s results reveal that The Mediterranean region attracts notable interest from multiple governments and international organizations to materialize the blue economy project as part of achieving sustainable development. Consequently, this aims to foster environmental and economic development that can benefit both the countries in the region and their populations.

It is worth noting here that the aforementioned previous studies are concerned with determining the relationship between the blue economy and sustainable development in countries worldwide and the Mediterranean region. From this standpoint, we can assert that our research paper stands out by presenting the latest possibilities for Algeria to invest in the blue economy during the period 2015-2022. The primary focus is directed towards the sectors of marine fishing and aquaculture, along with an exploration of Algeria’s 2030 Blue Economy Strategy.

Within this framework, we will present this work through three principal axes. The first axis is dedicated to the fundamental concepts of the blue economy, while the second axis will explore the relationship between the blue economy and sustainable development. Finally, our attention will be directed in the third axis towards showcasing Algeria’s potential in the realm of investment in marine fishing and aquaculture, in addition to an overview of its 2030 strategic plan.

2. Conceptual framework of the blue economy:

The blue economy revolves around seizing opportunities in the marine environment and ensuring its preservation. In this section, we will attempt to delve into this concept with a more detailed exploration.

2.1. Under-standing the Blue Economy:

Various definitions have been adopted for this concept, each shaped by the context and the targeted geographical area. Below are some of these definitions:

The United Nations Environment Programme, which pioneered the concept of the blue economy in island nations, notably in the Caribbean, defines it as an economy that contributes to improving human well-being and enhancing social justice, while substantially mitigating environmental risks and resource scarcity. Furthermore, the European Commission, which has adopted the blue economy as a novel growth paradigm for European Union countries, defines it as an economy, also referred to as the blue or maritime economy, encompassing all economic activities related to oceans, seas, and coastlines (<https://al-ain.com/article/blue-economy-sustainable-oceans-marine,2022>).

Many researchers view the blue economy as effective water resource management and reliance on seas and oceans for sustainable development, poverty eradication, and achieving food self-sufficiency. Consequently, the blue economy is linked to the sustainable utilization and conservation of water resources, comprising oceans, seas, lakes, and rivers, with the aim of directing economic growth, improving livelihoods, generating employment opportunities, all while ensuring the preservation of the environment, cultural values, and biodiversity. Engaging in debates about the blue economy with stakeholders is crucial in decision-making processes, as well as within educational frameworks or awareness-raising efforts (Arab Organization report, 2018, p. 7).

Based on the above definitions and in our endeavour to offer a comprehensive

definition of the blue economy, it can be described as an economy that generally seeks to maximize the economic returns from available marine services and resources. This is accomplished through directing investments, conducting research, and implementing suitable policies and mechanisms that guarantee sustainable growth for activities relying on these resources. Simultaneously, it ensures environmental and ecological preservation by prioritizing the sustainability of these resources and protecting them from pollution, overfishing, and other challenges.

2.2. Objectives and significance of the Blue Economy:

The Blue Economy aims to meet the needs and satisfy the requirements of future generations with products found in aquatic environments. The maritime transport sector seeks to play a role in minimizing marine environmental pollution, preventing harm to marine life, and safeguarding scarce water resources. The central objective can be segmented into the following (M.J. Spalding, 2016, p. 5):

- Providing social and economic returns for both current and future generations through enhancing food security, poverty eradication, and elevating living standards.
- Preserving the diversity, productivity, and functions of marine ecosystems, natural habitats, and ensuring the sustainable use and recycling of resources.
- Relying on clean technology and embracing renewable energy sources.
- Managing blue economy practices through comprehensive and sustainable methods, to minimize the actual impact on the marine environment.
- Engaging stakeholders in decision-making processes and raising awareness.
- Stimulating and advancing policies, investments, and innovations in the realm of food security, as numerous industrialized nations have witnessed substantial

economic growth through the exploitation of marine resources via shipping, commercial fishing, and aquaculture. This opens up considerable avenues for economic growth.

- With the blue economy reaching an annual value of approximately 1.5 trillion dollars, its academic definitions centre on the sustainable exploitation of marine and oceanic resources to foster economic growth and development. Its objective is to devise methods for the prudent management of these resources, especially water resources, and to contribute to the enduring conservation of seas, oceans, and lakes.

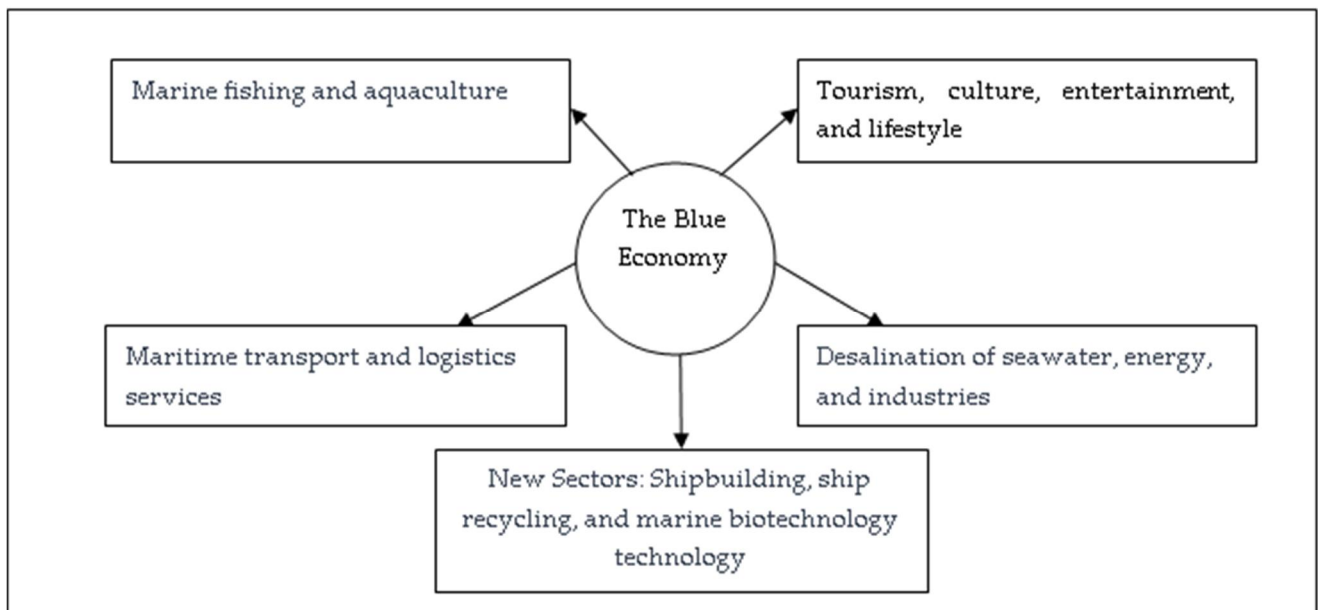
The increasing emphasis on blue economy is evident due to the fact that oceans and seas cover over three quarters of the Earth's surface, providing more than half of the world's oxygen and hosting between 50-80% of all life forms on our planet.

The fish caught from the oceans not only provide sustenance, livelihoods, and food security for coastal populations but also serve as a vital driver for economic development, particularly in developing countries. Approximately half of the world's population resides within 100 kilometres of the seas, and three quarters of the world's major cities are situated along coastlines. Moreover, 90% of globally traded goods are transported through the seas. The global ocean-based economy is estimated to be around \$3 trillion annually, constituting approximately 5% of the world's total gross domestic product. Industries within the blue economy offer livelihoods for over 820 million people worldwide, encompassing diverse sectors such as maritime shipping, energy generation, mining, construction, trade, tourism, research, and more. Furthermore, the blue economy plays a crucial role in ecological services, such as carbon sequestration. (Blue Economy, 2022)

2.3. Domains of the Blue Economy:

The blue economy includes various activities related to oceans, seas, and coasts, including coastal tourism, maritime transport, marine fisheries, aquaculture, and the associated fishing fleets and industries. The following figure illustrates the various productive sectors associated with the blue economy.

Fig.1. The Blue economy and the relevant sector



Source: Omar Bourahim, How Marine Spatial Planning Can Promote Sustainable Blue Economy, virtual seminar funded jointly by the European Maritime and Fisheries Fund of the European Union, May 2020, p. 15.

3. The Relationship of the blue economy to sustainable development:

One of the objectives outlined in the United Nations' Sustainable Development Agenda for 2030 is a standalone goal seeking the sustainable use and preservation of life underwater, known as Goal 14. This goal emphasizes the preservation of oceans, seas, and marine resources and their sustainable utilization. This conforms to the concept of sustainable blue economy, where we will explore the idea of sustainable development first and then delve into the concept of sustainable blue economy, combining both terms of blue economy and sustainable development.

3.1. The meaning of sustainable development:

Sustainable development is embodied in the preservation and sustainability of diverse resources in the environment, meeting the social and economic needs of the population, and managing them with the most advanced technologies and available knowledge, ensuring the persistence of resources for the well-being of future generations. It is defined as any development that meets the present aspirations and needs without compromising or jeopardizing the ability of future generations to meet their own needs (Kamiri, 2020, p. 125).

Hence, sustainable development is the development that achieves a balance between the ecological, economic, and social systems at the regional community level, and contributes to maximizing growth in each of these three systems without adversely affecting the development in any of the other systems. As for the dimensions of sustainable development, they include the following (Youcef, 2018):

- **Economic Dimension:** For affluent countries, it means a significant and continuous reduction in their consumption of energy and natural resources, advocating for the global exportation of their industrial development model. As for poorer countries, sustainable development means utilizing resources to elevate the living standards of the most impoverished populations.
- **Human and Social Dimension:** Sustainable development aims to stabilize population growth, put an end to random and unregulated migration, and achieve an improved quality of life by enhancing healthcare and education services. It also seeks to encourage greater public participation in development planning.
- **Environmental Aspect:** Encompasses the optimal utilization of agricultural land, water resources, and the implementation of clean technologies that minimize energy and resource consumption while releasing minimal gases and pollutants.

3.1. Sustainable blue economy:

The fourteenth goal of the Sustainable Development Goals (SDGs) aspires to preserve oceans, seas, and marine resources and use them sustainably for the purpose of sustainable development. This is what is meant by sustainable blue economy, where the significance of oceans in sustainable development is widely acknowledged by the global community. It is an integral part of the fundamental commitments made by member states in this regard. SDG 14 aims to prevent and significantly reduce marine pollution, support sustainable management and protection of marine and coastal ecosystems, address the impacts of ocean acidification, regulate fishing activities, end overfishing, illegal, unreported, and unregulated fishing, destructive fishing practices, conserve coastal and marine areas, increase economic benefits for developing and least developed countries from the sustainable use of marine resources, and enhance means of implementation. This includes bolstering scientific knowledge, transferring marine technology, and implementing international law, as outlined in the United Nations Convention on the Law of the Sea (UNCLOS) of 1982 (Blue Economy, 2022).

Concerning the principles of sustainable blue economy, the World-Wide Fund for Nature (WWF) has outlined a set of principles that encompass the following (Blue Economy, 2022):

- Providing social and economic returns for both current and future generations by contributing to the attainment of food security, poverty eradication, enhanced living standards, and improved income, in addition to providing employment opportunities, ensuring safety, and achieving sustainable health, security, and political development.
- Preserving the diversity, productivity, functions, and value of marine ecological systems and the natural habitats essential for their prosperity.

- Relying on clean technology and renewable energy, along with recycling materials, to ensure the continuity of economic and social sustainability.
- Managing the blue economy is achieved through the application of management approaches that are comprehensive, sustainable (built on active and effective stakeholder participation), informed, and preventive. Decisions should be grounded in reliable scientific information to avoid detrimental effects that jeopardize long-term sustainability.
- Facilitating dialogue with relevant stakeholders, and emphasizing the significance of establishing a common definition and reference framework for the blue economy.
- Fostering commitment from governmental bodies and all pertinent stakeholders associated with the vision of sustainable blue economy... and striving to translate this vision into tangible global reality annually. This figure is subject to annual increase, highlighting the potential of small island developing states and coastal nations, particularly those considered among the least developed.

4. Algeria's endeavors in the realm of blue economy and its role in bolstering the trajectory of sustainable development:

Algeria possesses a vast coastline along the Mediterranean Sea, stretching approximately 1622 km. Situated in a region abundant in fishery resources, oil and gas, petrochemicals, coral reefs, and scenic tourism, it provides the potential for establishing model border economic and industrial cities. This, in turn, allows for economic connectivity with African, European, and Middle Eastern nations bordering the sea, as well as with Arab countries, fostering economic integration and creating opportunities for achieving food security and sustainable development. This is achieved through the utilization of natural resources, including marine wealth and minerals within the sea.

4.1. Algeria's investment in the fisheries and aquaculture sector:

Algeria has recognized the importance of leveraging its marine resources to progress in the economic, social, and environmental dimensions of sustainable development. In pursuit of this objective, the country has introduced a series of laws and announced multiple programs and initiatives. In the following, we will underscore Algeria's noteworthy endeavors in the realm of investing in the blue economy, particularly within the sectors of maritime fishing and aquaculture.

Maritime fishing holds a prominent position in Algeria's economic landscape and fish market, receiving substantial attention from governmental bodies. In certain cities, ports have been specifically designated for sea fishing vessels. Moreover, Algeria has fostered partnerships with foreign fishing vessel owners, particularly from Spain and Italy. The country has also invested in the development of training and education across various domains and specializations within the maritime fishing sector. Regarding aquaculture, Algeria has witnessed notable progress in this field since 2014. This progress can be credited to the encouragement and incentives provided to investors, including favorable licensing fees, full coverage of banking benefits, and the signing of agreements with support agencies to facilitate procedures for investors. The table below shows the key statistical indicators for maritime fishing and aquaculture in Algeria during the period 2015-2019:

					Unit: Tonne
Year	2015	2016	2017	2018	2019
Total Fish	105.200	102.140	108.300	120.354	104.884

Production					
Aquaculture Production	1327	1960	4200	5100	4735
Exports	669.15	730.01	816.73	1443	1.090.26
Imports	11.446.68	12.740.72	13.517.70	11.607	140.664

Table 1. Key statistical indicators for maritime fishing and aquaculture in Algeria for the period 2015-2019:

Source: National Office of Statistics

The above table reveals that the national fish production reached 120,354 tons in 2018, compared to 105,200 tons in 2015, reflecting a growth of 14.40%. This notable increase in overall production is primarily attributed to the rise in catches of surface fish, specifically those dwelling at depths below 200 meters (such as tuna). Conversely, the national fish production witnessed a decline of 12.85% in the year 2019 compared to 2018. This reduction can be attributed to decreased production of bottom-dwelling fish, which inhabit depths above 200 meters and heavily rely on the seabed for sustenance, in addition to a downturn in the production of crustaceans and recreational fishing.

Meanwhile, the aquaculture sector continued its upward trajectory that commenced in 2015, reaching 5,100 tons in 2018. This positive trend is a direct outcome of the state's efforts in aquaculture, making a positive impact on national production. However, the aquaculture sector experienced a setback in 2019.

In terms of the foreign trade of seafood products, the export of marine products has shown a continual increase throughout the study period. This can be attributed to the resurgence in the export of specific marine products, such as oysters, fresh fish, and live fish. Conversely, when it comes to imports, there has been a consistent decline from 2015 to 2019. This trend facilitates the achievement of a positive trade balance in the maritime fishing and aquaculture sector.

Despite the health challenges faced by Algeria due to the spread of the COVID-19 virus and its local implications, especially with the initial disruption of activities at several ports and a reduction in the number of sailors aboard fishing vessels, these circumstances did not hinder the activities of maritime fishing and aquaculture. Various departments and directorates within the Ministry of Maritime Fishing and Fisheries Products successfully executed projects, made decisions, enacted regulatory measures and laws, signed agreements, and managed the sector in a comprehensive manner. This was accomplished at all levels, involving the entire population and activities associated with maritime fishing and aquaculture, with the aim of fostering the anticipated consensus for advancing the overall progress of the sector. The objective was to strengthen it with the means to meet food security requirements and consumer needs, all within the framework of an economic sector that creates wealth and job opportunities (https://mpeche.gov.dz/?page_id=1296, 2022).

4.2. Algeria's blue economy strategy for 2030:

As part of the National Blue Economy Strategy for 2030, and in addition to all the efforts invested in the Blue Belt, Algeria intends to accomplish the following:

- Fostering sustainable and integrated social and economic development by enhancing the capabilities of existing sectors.
- Encouraging emerging sectors with a focus on investing in promising future sectors, such as biotechnologies, genetic resources, aquaculture, and transformative industries.
- Accelerating promoting the swift shift from the conventional survival-oriented perspective of stakeholders in this field to an institutional profit-oriented approach centered on wealth creation.
- Developing a new vision for maritime activities and navigation by attracting

both public and private investors to diversify the national economy and ensure sustainable development.

- Ensuring the integration between water, renewable solar, and hydropower energy.
- Positioning Algeria's geostrategic location as a pivotal link on the Arab, African, and European fronts, aiming to serve as a vital portal for the transit of materials, services, and technologies in the international blue economy.
- Creating a promotional media system to accompany this overall strategy for the blue economy, implementing it on both a national and international scale.
- Facilitating and incentivizing entrepreneurs to establish specialized profit-oriented banking and insurance institutions, dedicated to financing and insuring various stakeholders and participants in this sector.

5. CONCLUSION

From the foregoing, it can be inferred that the emergence of the concept of the blue economy has led to a rethinking of the reality of seas and oceans and their associated elements, particularly given the challenges posed by ecological system imbalances and inefficient resource utilization. This has led numerous countries and international organizations to accord a paramount importance to this issue in order to realize the Blue Economy project within the framework of achieving sustainable development, particularly in Algeria. Algeria has invested considerable efforts in the context of the blue belt, especially in relation to coastal tourism, maritime transport, marine fishing, and aquaculture.

The results obtained clearly indicate the validation of the first hypothesis, asserting that the blue economy takes center stage as a pivotal solution that can be adopted in Algeria to advance sustainable development. This hinges on meticulous strategic

planning for the effective transformation towards this economic paradigm. The realization of the second hypothesis is apparent, with the blue economy in Algeria holds the potential to enhance its economic performance, refraining from relying on diminishing energies that endanger the environment and erode the rights of future generations.

The statistics in Table (01) demonstrate a relative fulfillment of the third hypothesis, showing that Algeria has begun to establish the foundations of the blue economy in the sectors of marine fishing and aquaculture, although there are still several stages ahead that need to be undertaken to guarantee the conclusive shift to the principles of the blue economy in this pivotal sector.

The main recommendations center around activating Algeria's transition to the blue economy as an alternative to the hydrocarbon sector, within the framework of the National Strategy for the year 2030. Special attention is given to the advancement of the marine fishing and aquaculture sectors, with emphasis on the following points:

- Prioritizing investment in the human element is considered the most important and crucial factor in driving the implementation of the National Strategy for the Blue Economy for the year 2030, and which should benefit from continuous training to keep pace with the new areas relied upon in executing this strategy.
- Enhancing the engagement of Algerian researchers in marine sciences, marine fishing, and aquaculture, along with facilitating coordinated efforts and collaboration among them.
- The need to enhance and activate the legal framework to include activities which are not currently covered by existing laws. This encompasses activities such as pharmaceutical production from marine raw materials, recycling of old boats and ships, as well as activities related to oil and gas production in deep waters, and the utilization of wind energy generated by tides, currents, and sea waves.

- Encouraging effective collaboration among diverse sectors associated with the sea, including tourism, transportation, environment, water resources, and even the Ministry of Energy. This collaboration is essential to ensure the rational and sustainable utilization of the sea and marine resources over the long term.

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