

Potential and Opportunities of the “Blue Economy” to Create Conditions for Sustainable Food Security in Coastal Cities

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Abstract: - This paper examines the concept of the “blue economy” as a strategic approach for the sustainable use of ocean and sea resources to promote economic growth, social well-being, and environmental sustainability. Particular emphasis is placed on the link between the blue economy and food security, especially in the context of coastal cities that depend on marine resources for food and income. Key challenges are described, including pollution, climate change, overfishing, and degradation of marine ecosystems. Solutions are proposed through sustainable fishing, development of responsible aquaculture, innovative marine technologies, and maritime spatial planning. The emphasis is on implementing environmental and management innovations to ensure the long-term stability of marine ecosystems and sustainable access to seafood. The European Union plays a key role in this transition through policies such as the “Green Deal”, the “Blue Growth” strategy, and mechanisms for the greening of the maritime economy. Bulgaria is actively involved through programmes for sustainable aquaculture, maritime spatial planning, and the fight against illegal fishing, especially in the Black Sea region. The article highlights the need for an interdisciplinary and international approach based on scientific evidence and sustainable policies. The conclusion is that the blue economy is not just an economic concept, but an integrated strategy for the future of coastal societies and global food security.

Key-Words: - Blue Economy, Sustainability, Food Security, Coastal Cities, Aquaculture, Maritime Spatial Planning, Black Sea.

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1 Introduction

The concept of “blue economy” is becoming increasingly widespread on the agenda of international organisations and in the formation of national development strategies. A feature of this concept is the emphasis on the systematic and sustainable development of economic sectors related to the use of the resources of the World Ocean and the seas. Terminological and sectoral differences in the understanding of “blue economy” continue to exist, which complicates international comparisons. The development of the concept of “blue economy” reflects the recognition of the exceptional role of the ocean and the seas in the global economy, expressed in:

1. Economic value. The World Wildlife Fund (WWF) estimates the global value of the oceans at 24 trillion US dollars;

2. Food security. According to the Food and Agriculture Organisation (FAO), the oceans and seas provide a livelihood for 10-12% of the Earth's population;
3. Climate regulation. According to estimates by the UN Intergovernmental Panel on Climate Change (IPCC), the oceans absorb 30% of the carbon dioxide generated by human activity.

Sustainable agricultural development requires integration and synergy between sectors, as well as a combination of social, economic and environmental aspects. It is a process in which different frameworks intersect – from technical to managerial and financial. Sustainable production methods and technologies also imply an approach based on synergy between the production and supply chain and natural resources. The term “Blue Economy” most often refers to a long-term strategy

to support sustainable growth in the maritime and related sectors. The Blue Economy is a strategy that aims to unlock the potential of the seas and oceans as drivers of economic growth, innovation and job creation, while ensuring the sustainability of the marine environment and food security. In the European Union, “Blue Growth” is the strategic contribution of the maritime sector to achieving the objectives of the Europe 2020 strategy for smart, sustainable and inclusive growth, [1]. The aim is to promote sustainable and inclusive economic development stemming from economic activities in oceans, seas, wetlands and coastal zones, while minimising environmental impacts and maximising economic and social benefits, [2].

The European Union is stepping up its efforts to regulate and govern the maritime economy. In a Communication published on 17 May 2021, the European Commission outlined a new EU approach to developing a sustainable Blue Economy, [3]. The fourth annual Blue Economy Report [4] was published on 20 May. Its publication coincides with the European Maritime Day, which has been celebrated in the EU since 2008.

The rapid degradation of the ecosystems of the World Ocean and the depletion of its resource base due to increasing environmental and economic pressures inevitably affect the well-being and health of people living in countries dependent on the ocean and seas.

The development of the “blue economy” faces a number of challenges, such as:

1. Climate challenges: acidification, rising sea levels, and warming of the World Ocean and an increase in the number of natural disasters in coastal areas;
2. Pollution of the World Ocean: accidents, dumping of untreated wastewater from land, as well as waste from ships into the seas and eutrophication (excessive enrichment of waters with nutrients);
3. Overexploitation of living resources of the ocean: destruction of habitats of fish and marine animals, and destruction of valuable ecosystems as a result of urbanisation, coastal development and the development of mass coastal tourism.

Despite growing challenges, the ocean offers humanity enormous opportunities and resources for development. Renewable ocean energy, including wave energy, tidal energy, offshore wind energy, marine solar energy and marine bioenergy, holds enormous potential. The ocean floor contains minerals essential for humanity’s “green transition”, and marine biotechnology is enabling the

development of new pharmaceuticals, medicines, cosmetics and livestock feed additives that reduce methane emissions.

Over the past half-century, the definition of food security has been continuously evolving, refined and expanded, from the availability of food to the four pillars of food security (availability, access, utilisation and stability), which have played an important role in shaping food policy. The diverse aspects of food security contribute to the expansion of the definition of this complex phenomenon in different historical periods, as a response to global economic, political events and scientific advances, which leads to the modern understanding of food security, its specific elements and their relevance for policy formation.

The strengthening of the main factors that determine the increasing absence of food security and malnutrition, such as conflicts, extreme weather events, and economic shocks, combined with the high price of food products and deepening inequality, generate serious challenges to food security and its sustainability. Countries with insecure food security, especially in Africa, are becoming increasingly dependent on food imports, making the state of international markets a decisive factor for their food security.

The impact of growing inequality and the complex linkages between food systems and other systems of the world economy lead to the need to reconsider the concept of food security. The modern dynamics of global processes developing in the field of food security are experiencing a wide range of crises that require the development of new approaches to overcome them. This makes the transformation of the concept of food security in modern conditions relevant.

The food security of coastal cities is closely dependent on the health and productivity of marine ecosystems, as they are the main source of food and income for these communities. The challenges faced by the “blue economy” have a direct negative impact on access to marine food resources:

1. Overexploitation of resources: depletion of fish stocks (due to overfishing) reduces the quantity and diversity of catches. This leads to protein shortages and a decrease in the income of local fishermen, which directly threatens food security;
2. Ocean pollution: pollution (from wastewater, industry and plastic) can lead to contamination of seafood (with heavy metals or toxins), making it unfit for consumption and posing a health risk to the population in coastal cities.

Eutrophication creates “dead zones” without oxygen, which destroys fish habitats;

3. Climate Challenges: Ocean warming changes the migration routes and breeding cycles of fish, making catches unpredictable and more difficult for local communities. Acidification threatens shellfish (mussels, oysters), which are an important part of the local diet.

The development of the “blue economy” aims to balance economic needs with environmental sustainability, which is key to the long-term food security of coastal cities:

1. Sustainability of aquaculture: The development of responsible marine biotechnology and aquaculture can supplement declining fish stocks, providing a stable source of food;

2. Marine Planning: The introduction of marine protected areas and sustainable catch quotas helps restore ecosystems, ensuring that future generations will also have access to marine resources;

3. Innovative food sources: Research in the field of marine bioenergy and algae can lead to the development of new, sustainable and nutrient-rich products that can diversify the diet of the population.

4. The strategic guidelines for the development of fisheries in Bulgaria are the conservation, reproduction and rational use of fish stocks in water bodies of natural origin, the implementation of the latest resource- and energy-saving technologies for fish production in water bodies of different origin and purpose, [5].

The methodology of the study is consistent with the need to achieve the set goal of analysing the potential and capabilities of the “blue economy” for creating conditions for sustainable food security in coastal cities, and is based on a combination of historical-logical, comparative-typological and analytical methods, as well as the method of scientific abstraction.

2 Contribution of the Blue Economy to the Sustainability of Coastal Food Systems

According to FAO, in different time periods, a certain factor occupies a leading position in the formation of food security, which can be traced in the official publications of the organisation. In the 2017 FAO report “The State of Food Security and Nutrition in the World”, conflicts are indicated as

the main factors hindering food security. In 2018, in its report, FAO identified climate change and extreme weather events as a key driving force for the growth of global hunger, one of the main causes of acute food crises and a factor contributing to the alarming levels of malnutrition observed in recent years, which negatively affect all aspects of food security and nutrition. The 2019 FAO report identified the slowdown in economic growth as a key factor in the rise in hunger and food insecurity. Indeed, most countries where hunger has increased have experienced periods of slowdown and economic decline. Economic decline leads people to buy cheaper and less food, which worsens the nutritional quality of their diets. According to the 2020 FAO report, the problem of increasing food insecurity and all forms of malnutrition is linked to the increase in food prices. This factor, combined with falling incomes, explains why about three billion people cannot afford even the cheapest healthy food. The main structural causes of food insecurity and malnutrition in all its forms, which exacerbate the negative impact of the above-mentioned global factors during the pandemic, are poverty and inequality. Poverty negatively impacts the quality of nutrition. Not surprisingly, healthy diets are inaccessible to the poor in all regions of the world. Food insecurity and malnutrition in all its forms are exacerbated by high and persistent levels of inequality - in terms of income, productive assets, and access to basic services (health, education), access to information and technology, which forms a digital divide. Income inequality increases the likelihood of food insecurity and undermines the positive impact of any economic growth on individual food security, [6].

An essential component of food security is food consumption, or nutrition, [7]. The availability or lack of availability of food products determines the fundamental level of food consumption and the choice of food products in terms of their quantity and quality. The right of every person to adequate food is recognised by the International Covenant on Economic, Social and Cultural Rights of 1966. The UN Committee on Economic, Social and Cultural Rights (CESCR) has defined the right to adequate food as follows: “... the right to adequate food is realised when every man, woman and child, individually or in combination, has physical and economic access at all times to adequate food or to the means to procure it. The core content of the right to adequate food presupposes the availability and accessibility of food products in quantities and quality sufficient to meet the nutritional needs of the person, free from harmful substances and acceptable

within the framework of the given culture. The availability and accessibility of food products must be stable and must not impede the realisation of other human rights”, [8].

The World Summit on Food Security in 2009 defined the difference between food security and food security. The main difference is that food security requires access to essential nutrients, while food security requires access only to calories. Food security includes physical, economic and social access to a balanced diet, safe drinking water, environmental hygiene, primary health care and primary education, [9]. As can be seen, food security encompasses both food and non-food attributes, [10]. Therefore, although water, for example, cannot be considered a food in the definition of food security, it is a vital part of food security. These definitions suggest that food security (and food security) is partly dependent on health services, a safe environment and can only be achieved when there is secure access to a nutritious diet in a healthy environment that includes clean water, sanitation, and the absence of pollution, together with adequate health services for all family members, [11]. An individual may be vulnerable to hunger even if they are not currently hungry. Obstacles to food access can arise as a result of economic and political crises, natural and climatic factors, cyclical events (seasonality in agriculture) and other adverse events. The concept of sustainability has been added to the interpretation of food security, which refers to both the availability of food and people's access to reliable sources of food, [12]. An important aspect of food security is recognised as sustainability [13], [14], which is understood as the ability of food systems to provide food security and nutrition in the present in a way that does not threaten the ecological, economic and social foundations necessary for food security and nutrition for future generations. In other words, sustainability is long-term in nature, in contrast to stability, which provides food security in the short term. Stability, unlike sustainability, does not take into account long-term dynamics and reflects only short-term disruptions in ensuring food security (natural disasters, conflicts, changes in market conditions).

Sustainability implies the use of methods in food systems that do not destroy ecosystems and ensure their protection in the long term, taking into account their interconnectedness and mutual influence with other systems (economic, social, and health systems) that are necessary to ensure food security and nutrition, [15], [16], [17]. The inclusion of sustainability in the concept of food security is

related to such growing global trends as climate change, degradation of natural resources and increasing social and economic inequality. These trends undermine food security and the ability of food systems to produce diverse and healthy food, as well as to provide livelihoods within food systems in the future.

The generally accepted definition of food security is “...a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and dietary preferences for an active and healthy lifestyle” [18] and implies the presence of such aspects as subjectivity (“for all people”, “taste preferences”) and sustainability (“permanent access” - this is not only the absence of instability in ensuring food security in the short term, but also the long-term stability of the food system, i.e. sustainability).

The blue economy must be fully integrated into the implementation program of the EU Green Deal, and it must become sustainable. By fulfilling this condition, it will play an important role in forming a competitive and resource-efficient economy of the European Union and will contribute to achieving its environmental and climate goals.

To address resource depletion and ensure long-term food security, the “blue economy” requires the implementation of management and technological innovations.

2.1 Sustainable Fishing (Conservation of Wild Resources)

The transition towards the sustainable use of wild marine resources requires the implementation of integrated strategies and mechanisms that ensure the long-term recovery of populations and the stability of ecosystems, as shown in Table 1 (Appendix).

2.2 Sustainable Development of Aquaculture

Aquaculture is an important additional source of protein when developed in a responsible and environmentally friendly way: Integrated multi-trophic aquaculture. This method combines the cultivation of different species (e.g. fish, shellfish and algae) that interact symbiotically. Waste from one species serves as food for the other. The advantage is to reduce the ecological footprint, prevent water pollution and ensure diversification of food production;

1. Offshore and recirculating systems. Moving aquaculture to external, deeper waters or using closed systems on land. The advantage is to minimise the risk of spreading diseases to wild

populations and reduce pollution of coastal waters;

2. Innovations in fish feed (feed). Development of feed based on plant proteins or microalgae instead of the traditional use of fishmeal, which requires catching wild fish. It reduces pressure on wild fish stocks and increases the sustainability of the entire seafood production chain.

These strategies, implemented in the context of the “blue economy”, are key to ensuring that coastal cities will continue to have reliable and healthy access to marine resources.

The key focus is set as transforming existing production and logistics chains into sustainable ones. However, several major challenges are set to be addressed. Greenhouse gas emissions must be reduced, environmental pollution must achieve “zero”, and underwater noise levels must be reduced. The carbon footprint of the maritime economy is planned to be reduced by developing coastal renewable energy and greening maritime transport and ports. The development of carbon-neutral industries is also planned, [19].

The EU aims to develop a circular economy and limit the amount of waste in the marine environment, primarily by reducing the level of pollution and combating its sources. Another priority is the preservation and restoration of biodiversity. This includes an ecosystem approach to marine environment management, by increasing the share of protected marine areas, creating “ecological corridors” in marine waters, etc.

To better adapt coastal areas to the effects of climate change, the development of green infrastructure is proposed, relying on various financial and organisational measures. The formation of “responsible food systems” implies a more efficient use of marine resources, as well as the possibility of using alternative types of food supply. For each of the listed tasks, the European Commission proposes a list of measures, [3].

3 Greening the Blue Economy Sectors

The Commission identifies a number of sectors on which the overall result of the greening of the maritime economy will depend. A crucial role is assigned to the marine (coastal) renewable energy sector. In the EU, this sector is mainly represented by offshore wind energy, where the European Union is the global leader – 90% of the world’s capacity, [4]. Although marine renewable energy is developing at an accelerated pace, its share in the

maritime economy remains more than modest. By the end of 2018, the sector provided 0.1% of all jobs and 0.5% of the gross value added of the EU’s maritime economy, [20]. By 2030, the EU plans to increase the capacity of renewable energy sources on the shelf 5 times, and by 2050, 30 times, [3]. New technologies for energy production in the World Ocean are also being developed. The transformation of the EU’s industrial landscape also covers ports. They must act as suppliers of clean energy for ships, as well as points for importing energy resources (liquefied natural gas and hydrogen). Ports should dispose of and process waste from ships and port enterprises (in support of the circular economy), which can have negative environmental consequences.

The European Commission identifies such important sectors for the maritime economy as fishing and aquaculture, responsible for carbon dioxide emissions, environmental pollution and biodiversity loss. Within the framework of the EU fisheries policy, which was last reformed in 2013, measures have already been provided for the transition of the sector to the principles of sustainable development. Similar measures are contained in the “Farm to Fork” strategy adopted in 2020, [21]. In these and other similar documents, the EU uses concepts such as responsible fishing and sustainable aquaculture. Their production, along with the production of algae, is an alternative to agricultural production.

Great importance is attached to the traditional sectors of the blue economy, such as maritime and coastal tourism, maritime transport, shipbuilding, etc. On the one hand, they play a significant role in the economy of individual EU countries (such as coastal tourism in Croatia and Bulgaria, [22]), and on the other hand, in their current state, they often cause environmental damage. Another focus concerns emerging industries (biotechnologies, seawater desalination) and new types of activities expected to emerge in the future.

National approaches to sustainable and comprehensive management of the “blue economy” are based on tools such as integrated coastal zone management, maritime spatial planning and the creation of protected marine areas. Not only developed, but also developing countries include the development of the “blue economy” in their national economic priorities.

The current challenges to the development of the “blue economy” require the development of international approaches to address them. New formats for international cooperation in the “blue economy” are being created, an international legal

framework for the development of ocean resources is being developed, new mechanisms for financing “blue economy” projects are being created, and indicators are being developed to assess progress in improving the social and environmental sustainability of “blue economy” sectors.

A general consensus on understanding the concept of a “blue economy” and harnessing the growth potential of the oceans was first reached by countries at the UN Conference on Sustainable Development “Rio+20” in 2012. In 2015, the concept formed the basis for the definition of the UN Sustainable Development Goals, in particular Goal 14, which states “to conserve and sustainably use the oceans, seas and marine resources for sustainable development”. The 2030 Agenda and the Sustainable Development Goals (SDGs) present sustainable development as a single goal and a single subject of collective responsibility of all countries and stakeholders. Achieving this goal is impossible without intersectoral and interdisciplinary interaction, international cooperation and mutual accountability, and will require problem-solving and policy-making based on the principles of inclusiveness, objective information and broad participation. The Sustainable Development Goals are truly transformative and interconnected. The United Nations Development Group and FAO have developed general guidance to ensure full reporting of the 2030 Agenda and related integrated programmes at the national level. Supporting and monitoring the implementation of these actions, formulating and formalising new voluntary commitments and promoting cooperation and networking aimed at achieving SDG 14 will be the focus of the Ocean Action Communities. Regional Fisheries Management Organizations (RFMOs), Contracting Parties, Cooperating Non-Contracting Parties and partner organizations are stepping up their efforts to achieve a wide range of SDG 14 targets and, as part of the review and update of their underlying instruments.

In line with the UN Ocean Conferences, FAO is committed to providing continued support for the achievement of SDG 14 in aspects such as:

Strengthening fisheries governance and the capacity of States to prevent, deter and eliminate Illegal, Unreported and Unregulated (IUU) fishing, by providing support to developing country parties;

Scaling up activities in support of small-scale fisheries through awareness-raising, strengthening institutional capacity, empowering fishers’ organisations engaged in small-scale fisheries, generating and disseminating knowledge.

Supporting policy reforms and providing technical assistance to support the implementation of the provisions of the Voluntary Guiding Principles for Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication;

Support for the fish trade so that it can contribute to the achievement of the SDGs by strengthening the multilateral trading system and ensuring that trade policies and strategies are consistent with other national policies aimed at expanding rights and opportunities.

The commitments also address support for the “blue economy”, small-scale fisheries and the provision of decent employment in fisheries and aquaculture.

The concept of the “blue economy” aims to promote the systematic and sustainable development of economic sectors related to the use of ocean and marine resources, and reflects the desire of the global community to find a balance between further economic growth and development, maintaining environmental safety and ensuring the social well-being and food security of the Earth’s population.

4 Five Key Principles for Sustainable Food Security of FAO

FAO has developed a common vision and a comprehensive approach to ensuring sustainability in all sectors of agriculture, forestry and fisheries. This unified position, formed for all agricultural sectors and taking into account the totality of social, economic and environmental factors, increases the effectiveness of efforts in this direction. It is based on the results of the latest scientific research, adapted at national and community levels, in order to ensure their local applicability and relevance:

- Principle 1: Increasing the efficiency of resource use is the most important condition for ensuring the sustainability of agriculture;
- Principle 2: Sustainability requires targeted efforts to preserve, protect and enhance the natural resource base;
- Principle 3: Agriculture that does not contribute to the preservation and multiplication of sources of income in rural areas, to improving equity, and to increasing social well-being cannot be considered sustainable;
- Principle 4: The key to sustainable agriculture is to enhance the adaptive capacity of people, local communities and ecosystems;

Principle 5: Sustainable food production and agriculture require the establishment of mechanisms for responsible and effective governance.

By strengthening the many international and national instruments and mechanisms for agricultural governance, FAO continues to promote sustainable resource use, including building the capacity of key stakeholders to negotiate and implement these instruments, as well as those who have access to data and use it to inform policy decisions and planning. In 2014 and 2015, FAO supported 74 countries through 215 initiatives that applied an integrated approach across sectors and enabled tangible results, such as improving natural resource management practices, exploring ecosystem-based approaches in fisheries and aquaculture, sustainably managing land and water resources, conserving biodiversity, and improving the planning and management of agricultural landscapes and territories. FAO is developing a coordinated approach aimed at increasing agricultural productivity and sustainability, using three interrelated fundamental principles:

1. Efficient use of resources, a transition to sustainable intensification of agriculture that allows us to produce more with less negative impacts on our resources;
2. Environmental protection and conservation, conserving resources to protect ecosystem biodiversity, water resources, soil fertility, and reduce environmental pollution;
3. Transition to a more climate-optimised agriculture, using a new approach, such as sustainable agriculture, to adapt to climate change and mitigate its effects.

These principles have different meanings depending on the specific agro-climatic and socio-economic conditions existing at the national and local levels. Climate-optimised agriculture exploits the advantages of synergies between these principles, but also allows for trade-offs between them and encourages evidence-based decision-making on the choice of options that will contribute most to achieving development goals.

5 Mechanisms for the EU's Transition to a Sustainable Blue Economy

To achieve these principles, the EU plans to use the instruments of an integrated maritime policy and blue growth, [23], [24]. The EU includes

management technologies (maritime spatial planning) as well as the introduction of environmental standards and rules (achieving good environmental status of EU marine waters in accordance with the 2008 Marine Strategy Framework Directive).

Among the mechanisms for implementing the transition to a sustainable blue economy, the EU also includes, [25]:

1. Programs for the formation of an integrated infrastructure for collecting complex data on the World Ocean (European Marine Monitoring Network and Database);
2. Systems for complex marine surveillance (Common Information Sharing Environment);
3. Financial, personnel, scientific, social and other projects.

At the same time, the EU is expanding their scope for the transformation of the blue economy, as well as developing new initiatives. For example, forming a base of marine data and ensuring their adaptation for widespread use, and then, through digital processing, transforming them into "knowledge and tools", as a centre for monitoring the development of the blue economy to provide up-to-date information and ocean monitoring to structure data collection.

The ongoing EU transition to sustainable investment in the maritime sectors, which is planned to be organised on the basis of the Principles for Financing a Resilient Blue Economy, [12]. At the same time, the EU continues to develop the Taxonomy - a system for classifying environmentally sustainable types of economic activity, [26]. To implement these plans, the EU is improving methods for managing marine use, expanding the application of maritime spatial planning and introducing multi-purpose use of marine space. It is also proposed to allow the use of the same water areas for non-conflicting types of activities. At the same time, the EU is synchronising the transformation processes of the blue economy with the introduction of changes in the guiding documents, by updating the Marine Strategy Framework Directive - the main document in the field of environmental marine policy. A characteristic feature of the EU initiatives is their focus on internal (within the Union) and external use, as well as on cross-border interaction, contributing to the progress of maritime spatial planning at the international level.

The EU plans are based on the need for a transition from a blue economy to a sustainable blue economy. The border between these two concepts is

blurred, since the blue economy represents an intermediate stage of transition from traditional sea use to a new, sustainable management of marine resources.

The EU continues to collect information to improve management mechanisms (maritime spatial planning), develop and implement environmental standards (good environmental status of marine waters), improve information (data collection) and control (monitoring of marine activity) activities, as well as improve and expand interaction between participants and regulators of maritime activity (international, regional, within a basin, etc. cooperation).

In the formulation of the European Commission, the blue economy covers types of activities that can be linked to the marine environment in one way or another. A sustainable economy, in addition to the economic component, includes “economic value that is based on natural capital and non-market goods and services, through the preservation of marine habitats and ecosystem services”, [27]. It can be assumed that in the conditions of a sustainable blue economy, economic activity will be linked to the environmental component (natural capital, ecosystem services, and their economic value). In particular, the European Commission plans to develop a methodology for integrating the concept of natural capital into economic decisions. To this end, the EU has developed methods for the economic valuation of marine ecosystem services, as well as the socio-economic costs and benefits of protecting the marine environment, [3].

Key sectors with potential for “Blue Growth” (according to the EU strategy) are five sectors with high potential for jobs, growth and food security:

1. Aquaculture (fish and shellfish farming);
2. Coastal and maritime tourism;
3. Marine biotechnology;
4. Ocean energy (e.g. offshore wind energy, wave and tidal energy).

Seabed mining (although the transition to a “sustainable blue economy” places emphasis on reducing extractive activities). In recent years, the focus has shifted from the term “Blue Growth” to “Sustainable Blue Economy”. “Blue Economy” (as a general term) encompasses all economic activities related to the oceans, seas and coasts, and “Sustainable Blue Economy” is the newer concept that calls for transforming these sectors to become more resource-efficient, competitive and beneficial to ocean health. This includes eliminating net greenhouse gas emissions, protecting natural capital

and investing in restorative activities, not just extraction.

Initiatives related to “Blue Economy” and “Blue Growth” in Bulgaria and the Black Sea Region

As an EU Member State, Bulgaria transposes all global and European commitments (including SDG 14 and FAO policies) directly into its national legislation and regional governance. The Black Sea cities (Varna, Burgas and smaller coastal municipalities) are the front line of the implementation of these goals.

The concept is also important for Bulgaria, especially in the context of the Black Sea:

5. National focus: A World Bank report notes that Bulgaria has a significant contribution of the blue economy to the national economy (including coastal tourism, fisheries, aquaculture and shipping);
6. Regional projects: There are cross-border projects, such as the “BLUE GROWTH COLLABs” project, which aims to establish blue growth research centres in Burgas and Edirne and focuses on: Microplastic pollution; The ecological status of water bodies and ecosystem services; The potential for sustainable use of water resources.

There is growing interest in the development of the blue economy by states and businesses. The blue economy can be defined as an economy that is based on the resources of the coastal strip of the seas and oceans and the maritime economic zone. Sometimes this model is narrowly interpreted as the ocean economy. The development of the blue economy is closely related to the “Sustainable Development Goal”, aimed at the conservation and rational use of the oceans, seas and marine resources in the interests of sustainable development, [26]. The blue economy includes both already established sectors and activities (fishing and processing, shipping, port management, maritime tourism, offshore oil and gas production, etc.), and new – largely innovative and high-tech – forming sectors and activities (aquaculture, wind energy facilities in the water areas, energy from sea and ocean tides, marine biotechnology, etc.) (Table 2, Appendix).

This list of sectors and activities can be expanded to include other factors that can affect the economies of coastal areas. For example, the significant role of the economies of water basins related to seas and oceans is obvious. For the Republic of Bulgaria, this includes the Danube River.

The theory of the “blue economy” from the perspective of national macroeconomic strategies focuses on three aspects:

1. National macroeconomic management;
2. Policy frameworks;
3. Management technologies.

Since 2012, the “blue economy” has entered a practical phase, after some countries and regions have proposed strategic frameworks and action plans for its development [28]. The “blue growth” strategy and the “blue innovation” plan of the European Union (EU) can be cited as examples.

In 2012, the EU proposed the Blue Growth Strategy, stating that Blue Growth would become the core of maritime policy and clearly outlining key areas for development and concrete measures for the future. The Blue Growth Strategy sets out initiatives in many policy areas relevant to Europe’s oceans, seas and coasts, encouraging cooperation between maritime businesses and public authorities across borders and sectors, as well as with stakeholders, to ensure the sustainability of the marine environment and its role in ensuring food security [28], [29], [5].

In 2014, the Blue Economy Innovation Plan was launched, stating that it would be implemented by three parties:

1. Developing sectors with high potential for sustainable jobs and growth;
2. Key components for providing knowledge, legal certainty and safety in the Blue Economy;
3. Sea basin strategies to provide individual measures and develop cooperation between countries.

In 2017, the EU issued a report on the Blue Growth Strategy. The report outlined five aspects:

4. Pursuing growth in five key areas, including blue energy, aquaculture, coastal and maritime tourism, blue biotechnology, and seabed minerals;
5. Leveraging marine data, spatial planning and maritime surveillance to support growth in the Blue Economy;
6. Promoting a partnership approach;
7. Stimulating investment;
8. Aligning the blue growth strategy with future challenges.

An example of a classic document is the “2018 Annual Economic Report on the EU Blue Economy”, which states that the concept of the “blue economy” – the marine and coastal counterpart of the “green economy” – continues to

take root in the community. At the same time, the “blue economy” remains firmly committed to conservation and sustainable management, based on the idea that healthy ocean ecosystems are more productive and are fundamental to sustainable economic activity and food security. Sustainable management is understood as economic activity being in balance with the long-term capacity of ocean ecosystems to support such activity and ensure food security, [24].

New concepts are introduced into the theory of the “blue economy”: “blue resources”, “blue natural capital”, “blue potential”, “blue growth”, “blue sector of the economy”. Surface and groundwater are defined as “blue waters”.

Underpinning all aspects of the “blue economy” from the perspective of natural “blue capital” is the ecosystem approach, which defines all the Sustainable Development Goals set out in the UN General Assembly resolution “Transforming our world: The 2030 Agenda for Sustainable Development”.

The report “The Ocean Economy. A Case for Action – 2015” considers two meanings of the term “blue economy”:

9. The use of the sea and its resources for sustainable economic development;
10. Any economic activity in the maritime sector.
11. In some cases, the terms “blue economy” and “ocean economy” are identified and used interchangeably. However, these two terms represent different concepts:
12. The “ocean economy” is simply related to the use of ocean resources and is strictly aimed at expanding the capabilities of the ocean economic system;
13. The “blue economy” goes beyond considering the ocean economy solely as a mechanism for economic growth. Its main focus is on the sustainability of the ocean for economic growth. The blue economy thus encompasses the environmental aspects of the ocean alongside the economic aspects.

The blue economy, like the green economy, aims for sustainable development without harming the environment and seeks to reduce environmental risks.

In addition to traditional ocean activities such as fishing, tourism and maritime transport, the blue economy encompasses new industries including renewable energy, aquaculture, seabed mining, marine biotechnology and bioresearch. It also seeks to include the ecosystem services of the ocean that

are not covered by the market but provide significant contributions to the economy and human activities. These include carbon sequestration, coastal protection, waste disposal and the existence of biodiversity.

Sustainability Criteria

The new EU approaches shift the focus from blue growth to a sustainable blue economy. Companies that comply with the requirements will have an advantage in the initial stage of implementing the principles of sustainability. They must use or generate renewable resources, as well as take action to protect marine ecosystems, reduce pollution, adapt infrastructure to climate change, etc. Companies that do not comply with the requirements will be obliged to take appropriate measures and reduce their environmental impact.

An important step towards a sustainable blue economy is the development of sustainability criteria for the assessment of maritime economic activity. In March 2021, the EU published a study “Sustainability Criteria for the Blue Economy”, the result of which is the draft Rules for Measuring the Sustainability of the Blue Economy (Blue Economy Sustainability Framework). The study brings together four dimensions of sustainability: economic, environmental, social and governance. It presents a preliminary set of criteria and indicators that define the sectoral parameters for compliance with the new requirements. It is envisaged that individual criteria and indicators will be used to assess the sectors and sub-sectors of the blue economy. Their application leads to the personalisation of the sustainability of individual types of activity. They can also become the basis for new EU environmental requirements. They will probably be correlated with other EU environmental rules, for example, with the achievement of good environmental status of marine waters. The European Commission promotes the principles of a sustainable blue economy at a global level, since “many value chains are global and subject to global competition, and EU operators do business all over the world”, with the aim of “exporting their approaches” beyond its borders.

Bulgaria, as an EU Member State, transposes all global and European commitments into its national legislation and regional governance. Black Sea cities, such as Varna, Burgas and smaller coastal municipalities, fulfil international obligations by implementing and developing on their territory:

Institutional framework and SDG 14:

1. Transposition of EU policies. Bulgaria is bound by the EU Common Fisheries Policy (CFP) and the Marine Strategy Framework Directive (MSFD). These documents are the main mechanisms through which the principles of SDG 14 are implemented at the national level;
2. Regional responsibility. Coastal cities and municipalities (Varna, Burgas) are centres where Maritime Spatial Planning is implemented, which is an EU obligation and serves to balance economic development (tourism and energy) with the protection of the marine environment (SDG 14).

Combating IUU fishing (Illegal, Unreported and Unregulated):

3. Port control. Cities such as Varna and Burgas, with their ports, are key to the implementation of the Port State Measures Agreement (PSMA). State authorities (FAA – Executive Agency for Fisheries and Aquaculture) control fishing vessels entering these ports to ensure that they do not engage in IUU fishing;
4. Regional cooperation. Combating IUU fishing in the Black Sea requires intensive cooperation with neighbouring countries (Turkey, Romania, Ukraine, Georgia), which is coordinated by Bulgarian institutions based in the Black Sea cities.

Support for the “Blue Economy” and small-scale fishing:

5. Economic development. The concept of the “blue economy” is implemented through regional strategies focused on the sustainable development of tourism, aquaculture and maritime transport in the region of Varna and Burgas. This is directly linked to the sustainability goals, which should ensure decent employment;
6. Small-scale fishing. Support for small-scale fishing (SSF) is a key priority of the EU and FAO. In Bulgarian coastal settlements, local fishermen receive funding under the European Maritime, Fisheries and Aquaculture Fund (EMFF). This is in support of “the rights and opportunities of fishermen’s organisations” (the subjectivity aspect) and provides livelihoods, in line with the VGP, [30].

6 Sustainability and Ecology

Ecosystem protection: Black Sea cities face the challenge of pollution, especially as a result of

tourism and large rivers. Efforts to restore biodiversity (part of SDG 14) are implemented through the creation and management of Marine Protected Areas (Natura 2000) along the coast, which is a direct consequence of international commitments.

Through these mechanisms, global goals for the oceans are translated into concrete policies and measures managed by institutions and communities in Bulgarian Black Sea cities. With the support of the EU, projects on the “Blue Economy” and aquaculture are implemented. The implementation of the concepts of the “Blue Economy” and sustainable development of aquaculture in Bulgaria is mainly carried out through the Maritime Affairs, Fisheries and Aquaculture Programme (MAFA) for the period 2021–2027 (successor to the EMFAF).

The key guidelines and objectives are:

1. Sustainable aquaculture and food security. One of the main priorities is to support the sustainable and competitive development of aquaculture in the Black Sea region. This includes investments in the modernisation and expansion of farms that contribute to food security, with a focus on a lower carbon footprint in line with the European Green Deal;
2. Innovation and regenerative agriculture. Bulgaria participates in European initiatives aimed at smart specialisation in the Blue Economy. The emphasis is on blue biotechnologies, marine renewable energy, as well as regenerative ocean farming and innovations in the field of algae, which have potential for development in the Black Sea;
3. Community-Led Local Development (CLLD). Funds from the CLLD are directed to Local Initiative Fisheries Groups in coastal municipalities, including Varna and Burgas. By implementing CLLD strategies, local communities dependent on fishing are supported to diversify their economies, stimulating the environmental, social and economic sustainability of the territories;
4. BlueAct Project (2018–2020). The Municipality of Burgas participated in this interregional project, funded under URBACT III. The aim was to transfer good practices in the field of “blue entrepreneurship”. By establishing local business incubators and holding entrepreneurial competitions (“BurgasBlues”), Burgas directly promotes innovation and job creation in the Blue Economy sector. This example illustrates the direct link between international funds and

local economic development in Black Sea cities, [30].

7 Conclusion

The protection of the world's oceans and the Black Sea in particular is a global problem, and every country, even landlocked ones, can contribute to finding solutions. The concept of the “blue economy” is certainly suitable for solving this global problem, providing a unique and extremely relevant approach that combines social, economic and environmental aspects, allowing us to strive for sustainable development of countries and management of the seas and oceans.

The transition to a sustainable blue economy is declared by the European Union as a condition for the implementation of the Green Deal. The blue economy is presented as an intermediate and preparatory stage, during which management technologies and mechanisms for ensuring sustainable development are developed. The basis of sustainable development is personal responsibility for the use of marine resources and possible environmental damage. This can be seen as the personalisation of activities aimed at addressing the challenges of sustainable development.

The introduction of environmental standards and sustainability criteria for various sectors will limit economic activity. Non-compliance with the specified criteria may lead to sanctions and fines for individual operators (sectors) or to restrictive measures (restriction of access to marine areas, for example, through the use of maritime spatial planning mechanisms).

The concept of a sustainable blue economy and environmental standards for economic activity are legally enshrined in EU regulatory documents. In terms of maritime planning, achieving good environmental status of marine waters, fishing and sustainability criteria, etc., together create a regulatory framework for regulating economic activity in the World Ocean. Together with control, monitoring and other measures, they form a new system for managing the EU's marine resources.

The EU openly declares its aspiration to become a world leader in the field of ecology and, in terms of implementing the principles of a sustainable blue economy, promotes its strategies at the global level. To this end, it develops databases and modern monitoring tools, improves data processing and creates new scientific and information products. In this way, it concentrates in its own hands the information and scientific base for the World Ocean, strengthening its positions in these areas.

The evolution of the concept of food security and the inclusion of new complementary aspects in its definition occur at different historical moments, as a response to ongoing world events and scientific discoveries. In order for agriculture to contribute more to ensuring food security, a rethinking of current strategies and practices is required based on a transformation of the approach to the concept of food security. This process will be assisted by the inclusion in the concept of a wider range of aspects, including subjectivity (such as independence in making decisions about one's own food security) and sustainability (of food security in the long term), [30].

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APPENDIX

Table 1. Strategies and Mechanisms for Sustainable Fishing and their Impact on Food Security

Strategy	Mechanism of action	Impact on food security
Maritime spatial planning	Designation of marine protected areas and areas with restricted access for fishing	Allows fish stocks to recover and reproduce, increasing total biomass and future catches
Quotas and restrictions	Introducing a total allowable catch and regulating the number of fishing vessels or fishing time	Prevents overfishing and ensures that the rate of exploitation is lower than the rate of reproduction of populations
Selective fishing gears	Using nets with larger openings and gear that reduces bycatch (the incidental capture of non-target species)	Protects young fish and endangered species, ensuring long-term ecosystem stability

Source: Created by the authors.

Table 2. Sectors and types of activities in the blue economy depending on the nature of their formation

Already formed (traditional) sectors and activities	New, emerging (innovative and high-tech) sectors and activities
1. Industrial fishing; 2. Processing of marine products (fishing, fish farming, canning); 3. Shipping (transport of goods and passengers); 4. Port management (operation and management of ports); 5. Shipbuilding and repair; 6. Maritime tourism (cruises, beach tourism, water sports); 7. Offshore oil and gas production (exploration and exploitation of hydrocarbons on the sea shelf); 8. Maritime education and research and development; 9. Dredging.	1. Aquaculture (farming of aquatic organisms, using new methods); 2. Wind energy facilities in water areas (offshore wind farm); 3. Energy from sea and ocean tides (tidal energy); 4. Marine biotechnology (using marine organisms to develop new products, such as medicines, cosmetics, food supplements); 5. Deep-sea mining; 6. Maritime security and ocean monitoring and marine data (using sensors, satellites and big data).

Source: Created by the authors.

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