

The Blue Economy of the Western Black Sea

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Abstract

The blue economy comprises sectors related to maritime and coastal activities. These economic activities either depend directly on marine ecosystems or exert pressure on them. This close link between human welfare and the state of the environment is clearly visible in the exploitation of marine living resources, one of the illustrative sectors of the blue economy. An insight into the complex relationships between nature, economy and society is provided by the concept of sustainability. A set of indicators is used in an attempt to measure sustainability at a sectoral level. This pilot study tests the applicability of the recently proposed Blue Economy Sustainability Framework. The results show the existence of data gaps and the variation within the blue economy sectors in the western part of the Black Sea basin.

Keywords: blue economy, sustainability, Black Sea, fishery, seafood, value chain

JEL Code: Q22, Q56

Introduction

The concept of blue economy, referring to the nexus of sea and coastal economic activities and their relation to the marine ecosystems, gained popularity in the 2010s. Initially the emphasis was on the resources of the sea as a driver of economic growth, especially after the Great recession at the end of the first decade of this century. This impetus was to come from the post-crisis recovery of traditional sectors such as maritime transport and coastal tourism, and the development of new technologies such as offshore renewable energy and marine biotechnology. Efforts to achieve sustainable and inclusive economic growth in the European Union's maritime sectors have been channelled into the 2012 Blue Growth Strategy (COM(2012)0494).

The use of the term 'blue growth' was not limited to the EU; the Food and Agriculture Organization of the United Nations (FAO) launched its own blue growth initiative in 2013, which aims to strike a balance between economic growth, social development, food security and the sustainable use of aquatic living resources (FAO, 2022). The need to separate socio-economic development from environmental degradation of the oceans required a multifaceted definition of the blue economy (Smith-Godfrey, 2016). The lack of a clear definition of blue growth raised concerns among some stakeholders and researchers that the wide scope for interpretation could be a source of potential misunderstandings and possibly misguided governance outcomes (Eikeset *et al.*, 2018). An overemphasis on the rapid and uncontrolled expansion of the blue economy risks creating social inequities and damage to marine ecosystems (Bennett *et al.*, 2021).

Partly in response to this debate, but also in line with the objectives of the European Green Deal, the concept of blue growth has evolved over the past decade to the notion of a sustainable blue economy announced by the European Commission (COM(2021)0240). The current approach aims to transform value chains in the blue economy through programmes and instruments that support the development of sustainable maritime activities and by creating the conditions for sustainable governance.

Since 2018, an annual EU Blue Economy Report has been published with the aim of describing the scope and size of the blue economy in the European Union and providing a baseline to support policy makers and stakeholders in the pursuit of sustainable development of oceans, seas and coastal resources. The state of the blue economy can be described at different scales: from sea basin, to country, to economic sector or sub-sector. The current study provides an overview of the blue economy of the two EU member states bordering the Black Sea, with a particular focus on living resources as a sector at the interface between the coastal economy and the health of the

marine ecosystem. The study covers the period 2015–2020 due to the availability of comparable data for the region.

1. Size and scope of the blue economy in the western Black Sea basin

As a relatively new concept, the blue economy needs a working definition: “A sustainable blue economy promotes economic growth, social inclusion and improved livelihoods while ensuring the environmental sustainability of the natural capital of the oceans and seas.” (European Commission, 2021b, p. 16). The blue economy encompasses all sectoral and cross-sectoral economic activities related to oceans, seas and coasts. It includes emerging sectors as well as the value of natural capital and of non-market goods and services related to the conservation of marine habitats and the ecosystem services they generate.

The activities included in the blue economy can be conventionally divided into established and emerging sectors:

- Established sectors include exploitation of marine living and non-living resources, offshore wind energy, port activities, shipbuilding and ship repair, maritime transport and coastal tourism.
- Emerging sectors are represented by the development of new forms of ocean energy, blue biotechnologies, seawater desalination technologies, maritime defence, security and surveillance, research and innovation, infrastructure such as submarine cables.

The assessment of key indicators describing the blue economy is based on the position of the different maritime activities in the formation of value chains. Depending on the position of an activity, two broad groups can be considered (European Commission, 2022):

- *Marine-based activities*: encompass those carried out in the ocean, seas and coastal areas, such as harvesting of marine living resources (capture fisheries and aquaculture), extraction of marine non-living resources, generation of marine renewable energy, desalination, maritime transport and coastal tourism.
- *Marine-related activities*: activities that use products or provide products and services from the ocean or marine-based activities, such as seafood processing, biotechnology, shipbuilding and repair, port activities, ocean technology and equipment, digital services, etc.

The western Black Sea includes the coasts of Bulgaria and Romania and their exclusive economic zones (EEZs). The two EU member countries bordering the Black Sea together control about 15% of the sea area through their EEZs and have a total coastline of 623 km, with Bulgaria – 378 km and Romania – 245 km. The coastal areas at the level of NUTS 3 regions cover the following administrative units from north to south: Tulcea and Constanta counties in Romania, and Dobrich, Varna and Burgas districts in Bulgaria. The Romanian counties form 7% of the country’s area and are inhabited by about 860 thousand people or 4% of the total population and generate 5% of the national gross value added (GVA). The Bulgarian districts occupy a longer stretch of coastline and have greater weight in the national economy, which is slightly larger than a quarter of the Romanian one. The three coastal districts occupy 15% of the Bulgarian territory and their population of roughly one million represents the same share of the total population. The Bulgarian coastal regions contribute 12% of the national GVA.

The blue economy in Bulgaria creates over 93,000 jobs and a GVA of one billion euro in 2019 (European Commission, 2022). Marine activities support 2.9% of the total employment in the country and generate 1.8% of GVA on average over the period 2015–2019. Their contribution to the local economies of coastal municipalities and districts is much higher. The Romanian blue economy employs around 63,440 people and generates almost 1.1 billion euro in GVA (Figures 1 and 2). Sea and coastal activities provide 0.9% of the country's employment and contribute on average 0.6% of national GVA in 2015–2019.

The dynamics of the blue economy in the western part of the Black Sea is summarised by

the employment (Figure 1) and gross value added (Figure 2) of the established sectors. The offshore energy sector is not represented in the region.

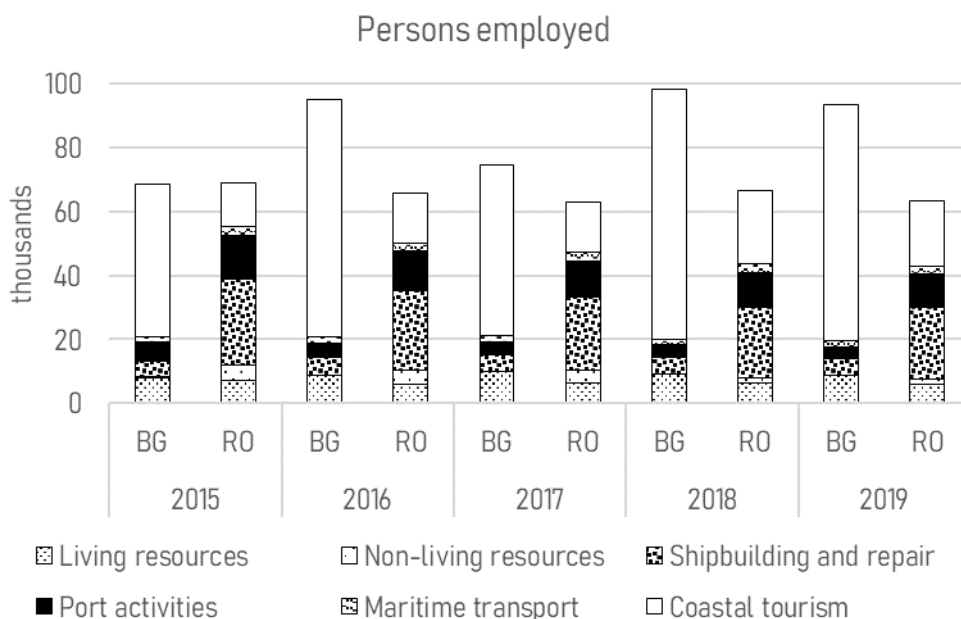


Figure 1. Employment in the blue economy of Bulgaria and Romania, 2015–2019, thousands of persons

Source: European Commission (2022)

Undoubtedly, the most important sector of the Bulgarian blue economy is coastal tourism with three quarters of the employed workforce and about two thirds of the GVA as a share of all maritime activities over the five-year period. In 2019, the sector accounted for 79% of marine-related jobs and 68% of GVA. Live resource extraction ranks second in terms of number of employees with an average of 8.9 thousand employees over the five-year period with no significant fluctuations between years. Shipbuilding and repair and living marine resources are also important generators of GVA, with 12% and 9% respectively, and both have been on a growth path in recent years.

In terms of employment, Romania’s blue economy provided a smaller number of jobs compared to Bulgaria in 2016–2019, but with less fluctuation. Shipbuilding and repair and coastal tourism were the largest contributors to the labour market in 2019, with 35% and 32% respectively. The two sectors contributed 37% and 28% of GVA respectively, with port activities coming third with 18% of GVA after a gradual decline compared to 2015.

The two economies exhibit differences not only in their sectoral structure, but also in terms of productivity, measured as GVA per worker. This indicator is 11,029 euro per worker in Bulgaria’s blue economy and 16,677 euro per worker in Romania in 2019. This discrepancy of one and a half times higher overall productivity in Romania is also reflected at the level of the national economies. At the same time the productivity in the blue economy is around 64% of the national average in both countries.

The existing data collection system provides an insight into the economic performance of the blue economy sectors. Some aspects of the social dimension of sea activities are subject to regular monitoring as well. Far less clear remains the environmental impact of these activities on the marine ecosystems. An attempt to overcome the existing deficiencies in evaluating the sustainability of the various economic activities in the sea and on the coast is the Blue Economy Sustainability Framework (European Commission, 2021b).

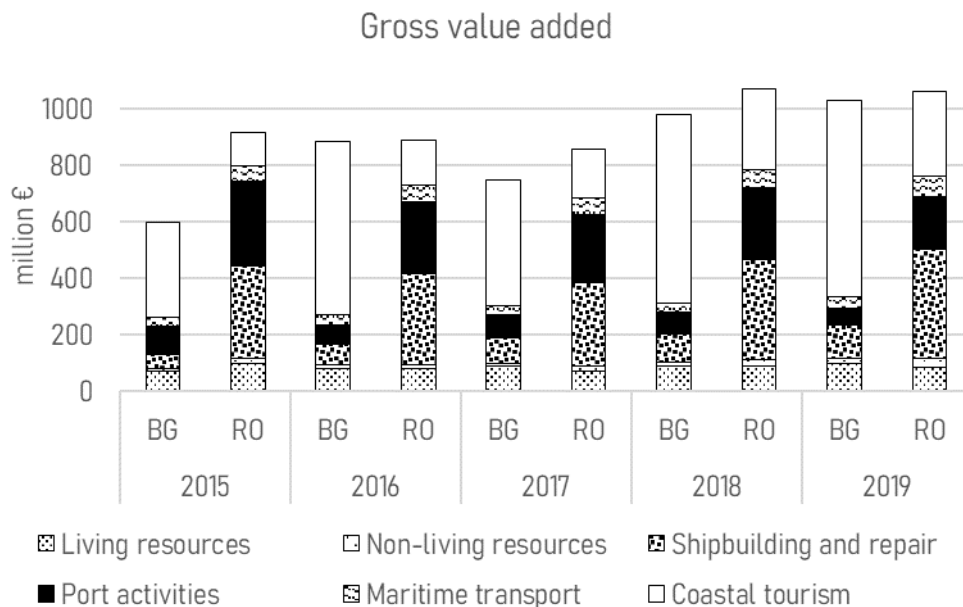


Figure 2. Gross value added in the blue economy sectors of Bulgaria and Romania, 2015–2019, million euro

Source: European Commission (2022)

2. Blue Economy Sustainability Framework

The Blue Economy Sustainability Framework (BESF) is based on four dimensions of sustainability: economic, environmental, social and governance (European Commission, 2021a). The strength of this framework lies in its ability to consider and combine different dimensions of sustainability. Sustainability management presents a complex and multidimensional concept that seeks to create a dynamic balance between the economic, social, environmental and institutional or governance dimensions (Figure 3). It is therefore important to take into account how the four dimensions are balanced against each other when drawing conclusions.

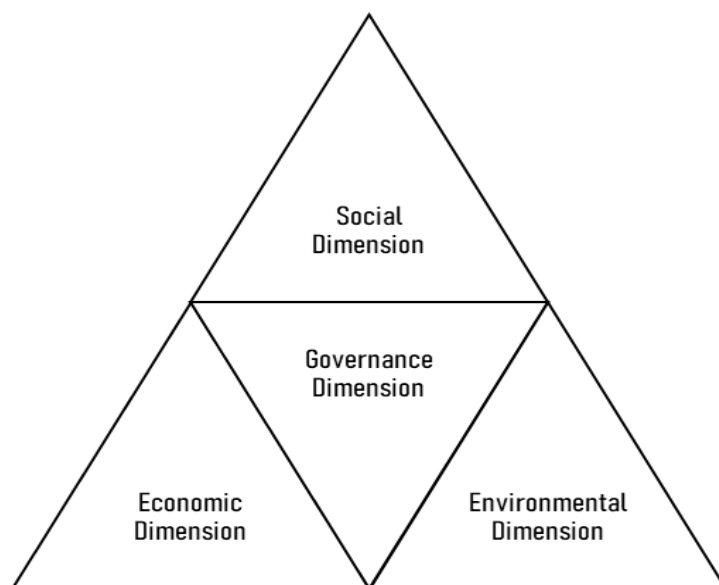


Figure 3. Balance in sustainability dimensions for the blue economy sectors

Source: European Commission (2021a)

For each dimension, a number of key sustainability aspects are grouped into a set of criteria. The criteria are linked to indicators that allow the sustainability aspects to be measured. The indicators form the core of the framework, providing a tool for analysing the complexity and characteristics of sectors in a structured and coherent way. The application of the framework makes it possible to monitor the evolution of the same system either through case studies or over time.

The framework consists of three sets of indicators: common, key and sub-sector specific. The total number of common indicators is 44, covering all four dimensions of sustainability. A subset of 20 common indicators, considered essential, is the minimum required to assess the sustainability of an activity, project, company or sector. These are the core indicators. The third group is made up of indicators specific to the technology and organisation of a sub-sector, such as aquaculture or oil and gas extraction. Each indicator is characterised by a unit of measurement.

The BSEF follows a four-step approach in applying the methodology to a specific sector or sub-sector (Figure 4). The first step is to characterise the activity under consideration by describing the sector and its key stakeholders, as well as the spatial scale and time period covered. The next step is to identify sustainability criteria applicable to the sector or sub-sector. The third step is to carry out a value chain analysis (VCA), following the established approach of (Porter, 2008). The final step is to apply the selected criteria and indicators to the evaluated economic activity.



Figure 4. Steps for application of the Blue Economy Sustainability Framework

Source: European Commission (2021a)

3. Sustainability of the living resources sector

The marine living resources sector comprises the following three sub-sectors

- Primary production: capture fisheries (small-scale coastal and large-scale fleets) and aquaculture (marine, freshwater and shellfish);
- Processing of fish products: processing and preservation of fish, crustaceans and molluscs; preparation of meals, production of oils and fats and other food products;
- Distribution of fish products: retail sale of fish, crustaceans and molluscs through specialised shops and wholesalers.

The main actors in the sector are predominantly small and medium-sized enterprises, which are active in all three sub-sectors in both countries. Primary production is regulated by the Executive Agency for Fisheries and Aquaculture in Bulgaria and the National Agency for Fisheries and Aquaculture in Romania under the respective ministries of agriculture. Stock assessment and monitoring of the state of commercially important aquatic organisms is carried out by publicly funded research institutes. Control over the processing and distribution of seafood is exercised by the national food safety authorities.

The pilot study is conducted at national scale for the western Black Sea region and covers data for the period 2015–2020. It includes criteria describing all four dimensions of sustainability through key indicators. The selected criteria and indicators are presented in the final step of the study. The sustainability opportunities and constraints related to the primary activities along the value chain in the marine living resources sector are summarised in Table 1.

Table 1. Primary activities of the marine living resources sector

Segment	Short description	Opportunities for sustainability	Constraints for sustainability
1. <i>Inbound logistics</i>	Aquaculture – seed and feed production Fish processing – raw materials Distribution – seafood products	Recirculation systems for aquaculture Import of sustainable seafood products	Use of unsustainably sourced marine organisms
2. <i>Operations</i>	Fisheries – capture Aquaculture – grow up	Improved management of fish stocks	Overexploitation of fish stocks; Illegal, discarded catch and bycatch Competition for use of marine space with other sectors
3. <i>Outbound logistics</i>	Processing Distribution	Improving fish waste management	High CO ₂ emissions for refrigeration and transportation
4. <i>Marketing and sales</i>	Certification	Certification standards addressing sustainability aspects in the value chain	Insufficient tracing of the origin of imported seafood products
5. <i>Services</i>	Distribution	Emphasis on locally sourced seafood in restaurants and catering	Commoditisation of seafood

Source: After European Commission (2021a)

The sub-sectors of primary production, fish processing and distribution are closely linked and complement each other at the different stages of the value chain. In terms of inbound logistics finfish aquaculture depends on seed and feed production, while capture fisheries and marine shellfish aquaculture do not rely on inputs from other industries. Fish processing depends on locally produced (caught or farmed) or imported aquatic organisms, and distribution uses fresh, frozen or processed seafood as inputs. The operations of capture fisheries are aimed at the capture of target species, while aquaculture is focused on the rearing and harvesting of its production. Between a fifth and a quarter of the total volume of Bulgarian aquaculture is generated by Mediterranean mussel farms (World Bank, 2020), while the Romanian sub-sector is almost exclusively focused on freshwater species (STECF, 2021). The processing sector in both countries relies heavily on imported fish (80% in Romania) and the enterprises can be categorised according to the type of raw material used: fish caught in the Black Sea; crustaceans; molluscs; fish from freshwater aquaculture farms; caviar and seafood delicacies (STECF, 2022a). The fish distribution sub-sector is represented by one wholesale market in Bulgaria, wholesalers, retailers, and restaurants (EUMOFA, 2022a, 2022b). The outbound logistics of primary production is directed towards processing and distribution, with the processing sector supplying its products to the fish distribution sector, which in turn reaches domestic consumers through various channels or exports to overseas markets. Marketing and sales include initial sales for fisheries and aquaculture, attempts by processing and distribution companies to develop recognisable Black Sea products, and business-to-business activities to develop new export destinations. Services in the sector are mainly limited to restaurants and catering by producers and distributors.

The application of criteria and indicators is the final step in the sustainability framework. It focuses only on key indicators covering the environmental (EN), economic (EC), social (SO) and governance (GO) aspects of sustainability (Table 2).

Table 2. Criteria and key indicators for marine living resources

Code	Criteria	Indicator	Unit	Value BG	Value RO
C.EN.1	Mitigation	Gross value or percentage of revenue invested in environmental causes related to the sector's activities directly or indirectly	m EUR/year or % of revenue/year	-	-
C.EN.2	Emissions to air	Emissions of CO ₂	Tonnes of CO ₂ equivalent / year	3.2*	45.9*
C.EN.3	Impact on ecosystems	Extent of coastal and marine habitat positively/negatively impacted	Area of positively and negatively impacted habitat in hectares	-	-
C.EN.4	Impact on ecosystems	Threatened species (IUCN red list) of known species	%	-	-
C.EN.5	Impact on ecosystems	Support given to local entities working on the protection, conservation and management of local biodiversity	<ul style="list-style-type: none"> • % of turnover dedicated to such support or • If in-kind support (such as making manpower or machinery available free of charge, or donating land), describe 	-	-
C.EN.6	Level of energy consumption	Energy consumption	Tonnes of oil equivalent/year	2630**	1757**
C.EN.7	Level of energy consumption	Energy demand met by renewable energy	% total primary energy supply	-	-
C.EN.9	Waste / wastewater management	Waste generated and recycled Wastewater generated and reused	Tonnes of waste generated and recycled /year Million m ³ of wastewater generated and reused/ year	-	-
C.EC.4	Economic viability	Gross value added (Size of the national / regional sector)	m EUR/year	95.9	79.5
C.EC.6	Economic viability	Turnover	m EUR/year	620.7	518.6
C.EC.7	Employment	Direct and indirect jobs	1000 persons/year	9	6
C.EC.10	Financial viability	Financial self-sustainability of supported activities	Number of years required to achieve full financial self-sustainability of supported activities (e.g. debt-to-equity ratio)	-	-
C.SO.1	Employment conditions	Average wage of employees compared to sector average or national average	EUR/year, divided in male/female/other	6200 [†]	6500 [†]
C.SO.2	Employment conditions	Presence and level of activity of labour unions in the company/sector	Yes/No. If yes, specify	No	No
C.SO.3	Employment conditions	Informal employment	% informal employment of total employment	-	-
C.SO.7	Inclusiveness	Employment rate of vulnerable groups	% vulnerable people of total work force per social category. For every social category define:	61% ^c female	51% ^c female

			<ul style="list-style-type: none"> • Gender (% male / female / other) • Average age 		
C.SO.9	Level of acceptance by local community	Acceptance of environmental, economic and social impact by local communities	No. of reported actions of local communities against environmental, economic or social impacts	-	-
C.GO.2	Impact Assessment	Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEnA) and Socio-Economic Assessment (SEcA) conducted and enforced via monitoring and evaluation	Scores 1. no EIA/SEnA/SEcA conducted 2. EIA/SEnA/SEcA conducted but not implemented/enforced 3. EIA/SEnA/SEcA conducted and enforced via monitoring and evaluation	1	1
C.GO.8	Certification and labelling	Existence of a sustainability label or certificate	Score 1. No sustainability label or certification 2. Sustainability label(s) or certification exists/awarded (please specify) 3. Sustainability label(s) or certification applied	1	1
C.GO.11	Level of stakeholder engagement	Mechanism for stakeholder engagement	Score 1. No stakeholder involvement 2. Occasional consultation with stakeholders, focused on public actors 3. Specific mechanism for stakeholder engagement besides public actors	3	3

Source: Eurostat (2022); STECF (2022b)

Notes: * data for primary production; ** data for capture fisheries; † data for fish processing

The review of the BESF key indicators shows that there are data gaps for 9 out of 20 metrics, with the environmental criteria being the most affected. Values for some of the indicators are only available for certain sub-sectors. It should be taken into account that the marine living resources selected for the pilot study is probably the most closely monitored blue economy sector due to the long history of the Common Fisheries Policy.

Although it is not possible to draw a conclusion on the environmental dimension, the indicators for which data are available reveal structural differences in the primary production of Bulgaria and Romania. As Bulgaria has a higher volume of landings and a significant part of aquaculture is focused on molluscs, the amount of CO₂ emissions is lower. Greenhouse gas emissions from finfish farming – the case of Romania – are generally higher than those from shellfish farming (MacLeod et al., 2020). The higher energy consumption of Bulgaria's marine fisheries is generally proportional to the larger catch.

The indicators describing the economic dimension reflect the larger size of the Bulgarian part of the sector. Social conditions are more or less the same throughout the region. The same applies to the governance dimension. This is not surprising as the main stakeholder organisation, the Black Sea Advisory Council, includes representatives of the fisheries and aquaculture sectors from both countries.

Conclusion

The application of the Blue Economy Sustainability Framework to the marine living resources sector in Bulgaria and Romania is an attempt to highlight some of the complex decisions

faced by managers and policy makers in balancing economic, social, environmental and governance considerations. Although the sector is small by both European and national standards, it encompasses all the inherent contradictions of highly specialised activities based on renewable natural resources. In many cases it provides employment and a source of income for coastal communities, but it is also part of the global seafood trade networks. There are still many data gaps that could be filled in the medium term by concerted efforts to collect and provide information relevant to the sustainability dimensions of the blue economy.

Another finding of the Black Sea blue economy review is that it shows lower productivity levels compared to the average performance of the national economies of Bulgaria and Romania. This could be an indication for policy improvements if marine and coastal activities are to serve as a driver for improved welfare of local communities and a healthy marine ecosystem.

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