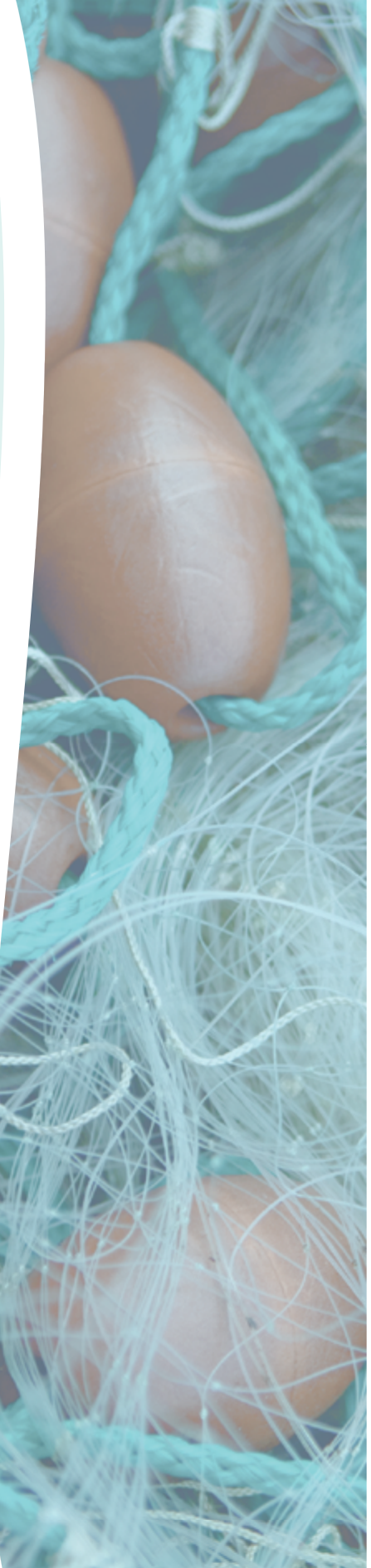
BLUEfasma

Interreg Mediterranean
BLUEfasma
Project co-financed by the European Regional Development Fund



Introduction

Fishing and aquaculture

Fishing is defined as the capture of fish or shellfish. Fisheries mainly deal with catching, processing and selling fish for human consumption or use in products. The sector's value chain stages include capturing, handling, storage, processing, distribution, consumption and valorisation of wastes and by-products.

Aquaculture is defined as "the farming of aquatic organisms including fish, mollusks, crustaceans and aquatic plants" (FAO). The Aquaculture value chain includes hatchery, fish feed manufacture, nursing, raising fish, finance and logistics, supply, marketing, processing, consumption and valorisation of wastes and by-products.

Fish is a vital source, accounting for about **16%** of the animal protein consumed globally. The UN Food and Agriculture Organization estimates that global **consumption** of **fish** has increased by **122%** since **1990**, with aquaculture providing half of this, a figure expected to exceed **60%**, by **2030**. The average person living in the EU consumes **24.4 kg** of **fish** or **seafood** per year[1], **25%** of it coming from **aquaculture**.

Fish is a vital source, accounting for about 16% of the animal protein consumed globally. The UN Food and Agriculture Organization estimates that global consumption of fish has increased by 122% since 1990, with aquaculture providing half of this, a figure expected to exceed 60%, by 2030. The average person living in the EU consumes 24.4 kg of fish or seafood per year, 25% of it coming from aquaculture. EU marine living resources - the sum of the primary sector, processing and distribution of fish products - generated a gross value added (GVA) of about €19.1 billion in 2018 (a 29% increase compared to 2009) and employed 538,350 people (EC, 2020). The EU is the fifth-largest producer of fishery and aquaculture products covering around 3% of the global production (EUMOFA, 2021). In parallel, the EU

1.European Commission report on the Common Fishery Policy (2020)

is a net importer of such products, with the fish-processing sector very dependent on the global fish market (EC, 2020). In 2019, the EU's self-sufficiency rate stood at 41.2%, reflecting a downward trend of EU catches and a subsequent increase in imports (EUMOFA, 2021). In 2020, the EU trade in fisheries and aquaculture products (the combined amounts of imports and exports with third countries) reached € 31.17 billion and 8.72 million tons (EUMOFA, 2021).

Fisheries and aquaculture sectors are facing particular challenges related to the overexploitation of wild fish stocks, the discarding of unwanted fish, the competition for space and markets, and administrative constraints for aquaculture (Bell et al., 2018). Natural resource depletion is worsening while the increase in seafood demand due to the growth of human population, as well as climate change, exacerbate the impacts and pressure on water resources. In addition, the impacts of the disruption to production and consumption caused by the COVID-19 pandemic further affect the sustainability of the sector (FAO, 2021).

It is clear that fisheries and aquaculture need to explore new ways to intensify their productivity and improve their environmental footprint at the same time (Rigueiro et al., 2021).

Implementing Circular Economy. What are the benefits?

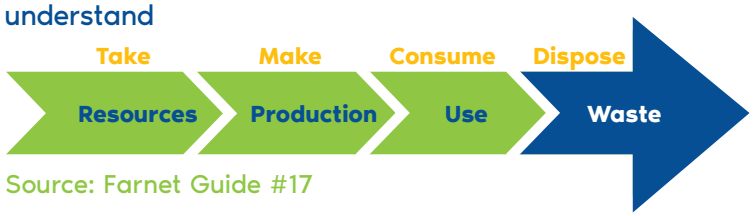
The main challenges of EU fisheries are related to the circular economy transition, in particular (i) the adaptation to climate change, and growing threats of (ii) marine debris and (iii) waste streams. Addressing these issues should not be seen only as a problem, but also as an opportunity to improve things from an intensive sustainable perspective.

the fundamental differences between linear and circular economies

Our current economic model is based heavily on the extraction of natural resources for products which are used by the consumer before being thrown away.

Circular economy thinking is fast becoming a guiding force in business and government, but to understand why it is so necessary, we must understand

That is the linear economic model, that follows the sequence of take, make, consume and dispose.



Source: Farnet Guide #17

This model is wasteful and is consuming the world's natural resources at a faster rate than they can be regenerated. Also, this model, produces large amounts of pollution – from non-biodegradable materials such as plastics, to toxic liquids and greenhouse gases, known for their contribution to climate change.

In contrast, the Circular Economy model of production and consumption aims to move closer to the cyclical processes in nature, involving sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended and waste is reduced to a minimum.

This innovative model involves a complete rethinking of our approach to products and services and how we consume them. Better use of resources, close the circuits of resource flows recovering as much as possible and prevent waste and pollution through better design.

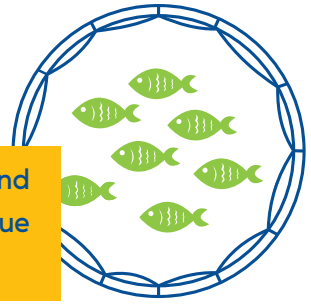
Source: European Parliament

Measures such as waste prevention, eco-design and re-use could save companies money while also reducing total annual greenhouse gas emissions. Currently, the production of materials we use everyday account for 45% of the CO2 emissions. Moving towards a more circular economy could deliver benefits such as reducing pressure on the environment, improving the security of the supply of raw materials, increasing competitiveness, stimulating innovation, boosting economic growth (an additional 0.5% of gross domestic product), creating jobs (700,000 jobs in the EU alone by 2030). Consumers will also be provided with more durable and innovative products that will increase the quality of life and save them money in the long term.

The environmental challenges derived from our current development model are critical, especially in the Mediterranean region which has been identified as one of the most sensitive to climate change in the world. Aware of these challenges, the governments must strive, both at the regional and national levels, to initiate political reforms that can accelerate the adoption of techniques and strategies and thus allow the change to new models of production and consumption of circular economy.

Several pieces of legislation and economic support address the need of achieving sustainability, however, various constraints inhibit the transition toward Circular Economy in EU economic sectors, including those of fishing and aquaculture.

The BLUEfasma project



Empowering innovation capacity of SMEs, maritime clusters and networks in MED islands and coastal areas to support blue circular economy growth in fishing/aquaculture.

Fishing and aquaculture are key blue economy sectors of insular and coastal areas, directly employing territories' population. However, in the Mediterranean there has not been effective systematic work towards Circular Economy in these sectors. In addition, Public Authorities and SMEs are cautious in embracing Circular Economy practices, which Public Authorities perceive as cumbersome and SMEs as non-profitable. In consequence, the Mediterranean Circular Economy innovation performance in these sectors is below EU average: this is the macro common challenge that BLUEfasma territories are facing and the common ground on which BLUEfasma was built.

To tackle above challenges, BLUEfasma integrates and implements Circular Economy principles in fishing and aquaculture to benefit Mediterranean insular and coastal areas by

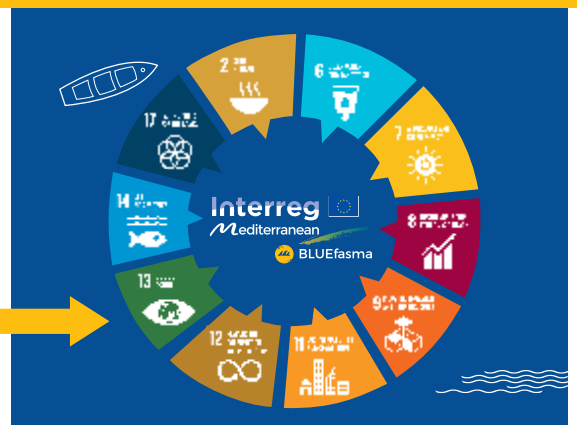
- changing the way businesses perform towards blue Circular Economy;
- triggering long term effects in smart/sustainable growth;
- preserving the environment;
- improving the quality of life;
- supporting the sustainability of key blue economy sectors which employ a large percentage of Mediterranean population;
- reinforcing effective systematic work towards blue Circular economy following the paradigm of Northern Europe.

BLUEfasma project is funded by the Interreg MED Programme 2014-2020, launched in November 2019 and ends in June 2022.

The partnership involves **14** **organizations** from **9** **countries:**

Greece, France, Spain, Italy, Cyprus, Croatia, Portugal, Montenegro Malta.

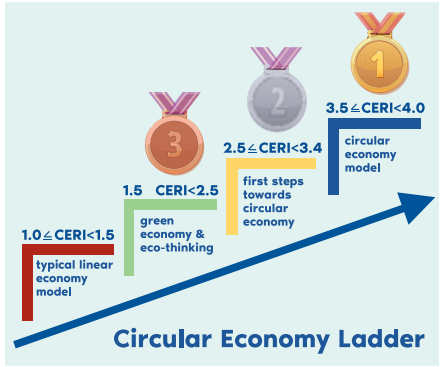
BLUEfasma is aligned with the Agenda 2030 Sustainable Development Goals (SDGs) contributing to the achievement of the following objectives:



BLUEfasma tools

BLUEfasma has developed the BLUEfasma online platform, a web-based application hosting the BLUEfasma tools and solutions, to increase blue actors' capacity and reinforce transnational cooperation towards a blue circular economy in the sector of fishing and aquaculture.
The online platform covers the different needs, perceptions, and expectations of users related or interested to the fields of fishing/ aquaculture and the entire fish chain, including large enterprises, SMEs, business support organizations, academia/ research, public authorities and EU policy makers as well as citizens in order to foster the implementation of circular approaches in the blue growth sector.

BLUEfasma Circularity Self-Assessment Tool



The BLUEfasma Circularity Self-Assessment Tool, is a unified Mediterranean measure of SMEs / enterprises readiness and willingness to invest in Circular Economy. The tool collects information related to the company's business profile, building facilities, general approach on Circular Economy and environment, eco-design, equipment, energy efficiency, choice of suppliers, distribution channels, waste recovering and repurposing and willingness towards circular economy. Based on the user's answers the tool automatically calculates the Circular Economy Readiness Index (CERI) showing company's Position at Circular Economy Ladder and the index of company's willingness to invest in Circular Economy, and generates personalised guidelines/recommendations towards Circular Economy.
Its personalized results help users review their current business practices, compare them with the provisions of the circular economy model and identify areas where new/improved solutions may be developed and introduced.

BLUEfasma e-network

Identified key actors of the fishing and aquaculture sectors are invited to join the BLUEfasma e-network. Through this transnational network the interested stakeholders will be able to exchange knowledge and experiences on topics relevant to the project objectives and benefit from the support of blue-innovation mentors and business angels offering targeted knowledge to its members, based on their expertise.

The BLUEfasma Circular Economy Knowledge Base.

The BLUEfasma Circular Economy knowledge base systematizes existing innovative practices, tools, solutions, and methods related to the Circular Economy in the key blue growth sector of fishing and aquaculture, to transfer existing knowledge and best practices to relevant SMEs and maritime clusters/networks and support them to increase their innovation capacity competence in blue Circular Economy market. Users can also add their own best practice and make it public through the platform.

Mediterranean Circular Economy Data

Testing activities were implemented in order to estimate the Mediterranean stakeholders' level of circularity, addressing the need for Mediterranean Circular Economy Data. The partnership located in 9 countries was in charge of testing the Mediterranean Circular Economy readiness and willingness indexes in their respective territories. The testing phase involved in total 114 stakeholders acting in the aquaculture and fishing value chain.

The results highlight that the Mediterranean stakeholders' level of circularity in the fishing and aquaculture sectors is rather low. Fishing and aquaculture remain traditional sectors, based on a traditional linear model. This model is wasteful and is consuming a lot of natural resources. The average Circular Economy Readiness Index (CERI) is 1.9 out of 4.0, which means that the companies follow green economy and eco-thinking in their businesses.

Among the stakeholders participated in testing phase, there is a general awareness that there should be a more rational use of raw materials benefiting the environment. Most of them are receptive and ready to invest and would like to find more ecological alternatives. The average grade for willingness to invest in Circular Economy is really encouraging, namely 3.5 out of 5.0.

BLUEfasma Capacity Building Instrument

The BLUEfasma Capacity Building Instrument integrates financing/mentoring/coaching opportunities for R&I business investment in fishing and aquaculture. Through this tool, SMEs/clusters/networks can get easy access to integrated financing opportunities and funding schemes, guidance from mentors and business angels and support in twinning/entering blue CE market; giving them a head start in forwarding their ideas for funding.

BLUEfasma Living Labs

The "BLUEfasma Living Labs" are transnational laboratories for co-creation and innovation. Their role is deployed within BLUEfasma project to change the stance of actors and civil society towards Circular Economy in blue growth sectors of fishing and aquaculture.

11 thematic BLUEfasma Living Labs Were established **11** territories in **9** countries

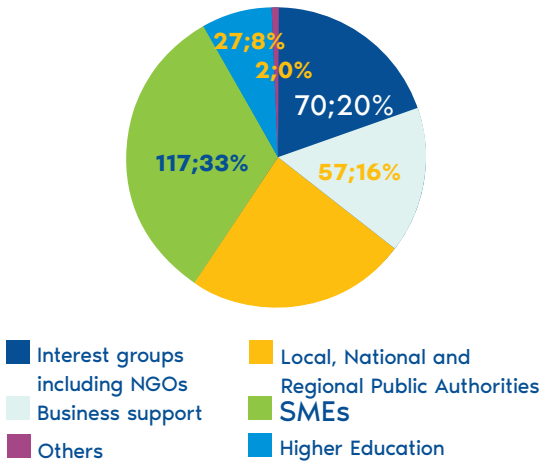
aiming at triggering behavioral change by transferring existing knowledge obtained within the project's pilots actions and during BLUEfasma preparation to project stakeholders and target groups. The Living Labs integrated R&I processes and created a user-oriented open innovation ecosystem that strengthened transnational cooperation and networking among existing clusters and networks of the blue Circular Economy market.

BLUEfasma Living Labs' Thematics

- The circular economy in the context of blue growth - **Portugal/ Lisbon**
- Innovative solutions to reduce energy costs - **Spain/Balearic Islands**
- Circular economy in retail and wholesale distribution: how to save and add value to products through good environmental practices – **Spain/Barcelona**
- Undertaking a path towards a circular economy in the fields of fisheries and aquaculture – **Italy/Sardinia**
- The Circular Economy and Blue Growth in Sicily – **Italy/Sicily**
- Safeguarding coastal heritage and recycling in fisheries - **Malta/Valletta**
- Circular economy in fisheries and aquaculture. Invasive species: threat or opportunity? – **Greece/Crete**
- Eco innovation in fisheries and aquaculture – **Montenegro/Kotor & Bar**
- The circular economy and the sustainability of natural resources – **Croatia/Dubrovnik**
- Innovation BLUEfasma Living Lab: Towards circular economy innovations for SMEs – **France/Toulon**
- Eco-design, turning production "waste" in resource and making usage more circular – **Cyprus/Larnaca**

Various actors joined the BLUEfasma Living Labs, 357 in total. More specifically, the SMEs were trained on the BLUEfasma online platform including the BLUEfasma self-assessment tool and funding opportunities for adapting Circular Economy principles in their business. They benefited from improved understanding of their level of readiness and willingness to invest in Circular Economy and were able to better develop and promote their business plans. The Public Authorities enhanced their innovation capacities and knowledge on blue Circular Economy growth and were able to design more effective policies. The Public Authorities understood the real needs of the fishing and aquaculture sectors for better allocating their funds.

Types of Stakeholders
Participants in general



The general conclusion is the manifest predisposition on the part of the fishing and aquaculture sectors to adopt the circular economy and prioritize its establishment along the value chain as a key element for the future. The barrier to a sustainable development of the sectors resides in the current framework of technical, legal, economic, and financial support. The quadruple helix has to work together to overcome the latent risks and meet the challenges identified in the BLUEfasma Living Labs.

BLUEfasma Policy Outputs

White paper

This White Paper presents the BLUEfasma Thematic working group work in support of the transition towards a circular economy in fisheries and aquaculture in the Mediterranean area, identifying existing barriers to the development of a Circular Economy and proposes solutions to overcome them. The White Paper explores the relationship between the principles of Circular Economy, Blue Economy and Sustainable fisheries and aquaculture, through the analysis of relevant sources and dialogue between several players.

Fisheries and aquaculture play an important role in achieving food security, livelihoods and economic development.

The overall demand for natural resources has increased dramatically and resource depletion is worsening, without any signs of trend inversion.

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Challenges Addressed

- Lack of harmonization and presence of legislative barriers that inhibit the transition to innovative systems in fisheries and aquaculture
- Limited attention to the efficient use of resources and the elimination of waste upstream and during the intermediate stages of the product life cycle
- Weak communication and dissemination of best practices and technologies between researchers, policy and decision makers and consumers
- Need for the development of financial and economic instruments and tools

Proposals to foster CE in Sustainable fishing and aquaculture

A review of the current legislation which aims to:

- Adopt end-of-waste criteria for promotion and easy re-use of fishing and aquaculture waste
- Make IMTA (Integrated Multi-Trophic Aquaculture), biofloc, aquaponics or aqua mimicry possible in EU countries and encourage related research and technology transfer
- Adopt sectoral and targeted eco-labelling and certification schemes quality standards and product stewardship for secondary raw materials to improve the marketability of the products
- Promote a higher integration in the adoption of EU legislation and reduce heterogeneity among member state legislations
- Support the adoption of the most relevant policies, especially the adoption of Maritime Spatial Planning in member countries and the related coastal regions
- Introduce agri-environmental payments for the (positive) externalities provided by (sustainable) fishing or (sustainable and/or organic) aquaculture to effectively support ecological transition in the sector
- Eliminate virgin material subsidies and introduce taxes or economic incentives to internalize externalization and make secondary raw materials more achievable
- Promote measures to reduce marine litter and pollution related to fishing gear abandonment or losses through the application of existing legislation and the promotion of new circular tools (such as return deposit)

Develop reliable and efficient economic tools by:

- Developing circular economy consistent business models for secondary raw materials and by-products to achieve for the more lucrative markets is a strong requirement for opening up these opportunities to the fishing and aquaculture sector
- Promoting information on the benefits (savings) achievable by an

- efficient use of resources (energy efficiency and precision aquaculture)

Promoting information on the benefits (additional earnings and reduced costs) of circular waste management (side streams and by-products) and secondary raw materials

- Promoting circular (public) procurement to support secondary raw material and remanufactured product markets and low impact products

Improve technological aspects through:

- Promoting the eco-design of the whole aquaculture processes from the initial phase of facility design to waste management, re-use and remanufacturing, including energy efficiency and precision aquaculture technologies and practices
- Reviewing current Life Cycle Assessment (LCA) and other indicators in order to demonstrate the effective performance of secondary raw materials
- Promoting the diffusion of new materials and tools to reduce the environmental impact related to fishing gear, especially plastic pollution

Improve attitudes towards a circular fishing and aquaculture by:

- Promoting knowledge of circularity through a more integrated and collaborative production (and consumption) system to promote sharing economy and the valorization of unused values (considering the possibility that more than one stakeholder uses the same good several times)
- Adopting a targeted communication strategy to inform other researchers, policy and decision makers and consumers about the best practices and technologies so that they will support the adoption of secondary raw materials and remanufactured goods
- Upskilling the fishing and aquaculture workforce to be able to make the transition toward a sustainable and circular fishing and aquaculture effective through complete information on the environmental, social, and economic benefits that could be achieved, meanwhile increasing the digital and technical competences required to adopt the existing supportive tools.

Policy recommendations

BLUEfasma policy recommendations aim to facilitate the integration and implementation of Circular Economy principles in Mediterranean fisheries and aquaculture, as well as funds allocation for business investment in R&I in these sectors. The policy recommendations address specific needs linked to key identified issues:

- allocating realistic and adequate funds to enable the fisheries and aquaculture sectors to adopt circular economy practices (FUNDING)
- establishing effective control mechanisms for applying for and managing relevant funding to ensure that the process of selecting operations complies with the existing governance criteria (GOVERNANCE)

- reviewing and updating EU legislation to allow for current techniques and successful innovations that promote circularity in aquaculture with safety for humans and fish, promoting of greater integration in the adoption of EU legislation on waste and waste treatment and reducing heterogeneity between Member States' legislation (REVIEWING OF LEGISLATION)
- promoting legislation, green fiscality and public- private cooperation for the consolidation and efficiency of sea waste collection by fishing boats, developing an integrated system, as well as financial and logistical measures for their management and means of data collection (SEA WASTE COLLECTION)
- encouraging viable and sustainable economic models for the transformation of waste into profit by supporting the development of existing and new projects and developing environmental compensation mechanisms (TURN WASTE INTO PROFIT)
- adopting of end-of-waste criteria for promoting and easy reuse of fishing and aquaculture waste and promote appropriate mechanisms for the quantification and sorting of waste (QUALIFICATION AND QUANTIFICATION OF WASTE)
- strengthening and developing collective organization and multilateral cooperation frameworks for joint responses to common challenges and opportunities (COLLECTIVE ORGANISATION AND ACTION)
- developing and implementing European eco-labelling and certification schemes for sustainable fishing, secondary raw materials and by-products (CREATING ECO-LABELS)
- promoting technology transfer and legislate funding criteria accordingly to foster innovation both in the selectivity of fishing tools and in the fishing activities and energetic efficiency (TECHNOLOGY TRANSFER)
- adopting a targeted communication to disseminate information and promote the knowledge on CE among the sector, consumers and decision makers (KNOWLEDGE DISSEMINATION)
- promoting the Blue Circular Economy and the funding to be earmarked for its development with a strategic vision in terms of generational renewal (GENERATIONAL TURNOVER)
- promoting the Blue Circular Economy and the funding to be earmarked for its development with a gender perspective (GENDER EQUALITY)

Closure note:

BLUEfasma is about rethinking circularity. BLUEfasma tackles the need for innovation data in the sectors of fishing and aquaculture by recording business readiness and willingness to invest in Circular Economy and supports the shift of relevant existing policies towards facilitating business investment in Circular Economy. BLUEfasma aspires to trigger transformation and change the way that businesses perform, having long term effects in smart and sustainable growth, while preserving the environment and improving the quality of life.

The BLUEfasma Partnership

- LP, University of Patras
- Region of Crete
- Dynamic Vision P.C
- Pôle Mer Méditerranée-Toulon Var Technologies
- Maritime Cluster of Balearic Islands
- MEDCITIES
- Taormina Etna Consortium
- IMC Foundation-International Marine Centre
- Larnaca-Famagusta District Development Agency ANETEL
- Dubrovnik Neretva Regional Development Agency DUNEA
- CEEETA-ECO, Energy Consultants Ltd.
- Chamber of Economy of Montenegro
- Ministry for Agriculture, Fisheries & Animal Rights
- Strategem Energy Ltd

Find us on:

website: **bluefasma.interreg-med.eu**
email: **bluefasma@gmail.com**
visit our online platform: **bluefasma.upatras.gr**

project partners:

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