SCUOLA di DOTTORATO
UNIVERSITÀ MEDITERRANEA DI REGGIO CALABRIA

Dottorato in Architettura

Coordinatore
Prof. Concetta Fallanca

Collegio dei docenti
Dottorato di Ricerca in Architettura
XXXVI ciclo

Francesca Fatta (coordinatore)
Adolfo Alberto Santini
Alba Sofi
Alberto De Capua
Alessandra Barresi
Alessandro Villari
Andrew James Hopkins
Antonella Blandina Maria Sarlo
Antonio Taccone
Aurora Angela Pisano
Bruno Mussari
Carmelina Bevilacqua
Carmelo Peter Bonsignore
Claudio Marciano'
Concetta Fallanca
Consuelo Nava
Corrado Trombetta
Daniele Colistra
Domenico Enrico Massimo
Domenico Gattuso
Domenico Marino
Domenico Mediati
Ettore Rocca
Flavia Martinelli
Francesca Giglio
Francesca Martorano
Francesca Moraci
Francesca Passalacqua
Francesco Calabro'
Francesco Cardullo
Franco Prampolini
Gabriella Pultrone
Gaetano Ginex
Giovanni Molica Bisci
Giuseppina Scamardi'
Lucia Della Spina
Marcello Sestito
Maria Teresa Lucarelli
Mariangela Musolino
Marina Mistretta
Marinella Arena
Martino Milardi
Massimo Lauria
Natalina Carra'
Nicola Impollonia
Ottavio Salvatore Amaro
Paolo Fuschi
Raffaele Pucinotti
Rita Simone
Rosa Marina Tornatora
Stefano Aragona
Tommaso Manfredi
Valerio Alberto Morabito
Venera Paola Raffa
Vincenzo Barrile
Vincenzo Gioffre

SCUOLA DI DOTTORATO
Università Mediterranea di Reggio Calabria

DIPARTIMENTO
Architettura e Territorio

DOTTORATO DI RICERCA
Architettura
Architecture: Urban Regeneration

S.S.D. ICAR/21
XXXVI CICLO

INVESTIGATING AND ANALYSING BLUE ECONOMY IN CALABRIA

Empowering Coastal Communities through Managing Complexity and Fostering Community-based development for Sustainable Transition

Dottoranda
Nourhan Hamdy

Tutor
Prof. Carmelina Bevilacqua

Co-Tutor
Prof. Alessandra Barresi

Coordinatore del dottorato
Prof. Concetta Fallanca

I would like to express my deepest gratitude to the CLUDs Lab, an invaluable asset to my research. The innovative methods, international networks, and collaborative approaches of the CLUDs Lab have significantly amplified the impact and effectiveness of my research. Being a part of SOUND and TREnD Projects and a member of the CLUDs Lab has been instrumental in achieving my research objectives and successfully navigating my doctoral program. I am particularly grateful to be part of the Trend Project, which provided me with the opportunity to study and conduct research at Northeastern University in Boston for a year. This experience has been invaluable in broadening my perspective and contributing to the depth of my research.

Special acknowledgment is reserved for my supervisor, Professor Carmelina Bevilacqua, whose unwavering support and assistance have been instrumental throughout my Ph.D. journey. Her guidance and mentorship have been pivotal in shaping the direction and quality of my research.

I extend heartfelt thanks to Researcher Pasquale Pizzimenti for generously sharing his knowledge and experience, contributing significantly to the depth and breadth of my research.

My deepest appreciation goes to my family for their endless support and encouragement. Their belief in my abilities has been a constant source of motivation. I also want to express my gratitude to my friends, both back home and around the world, for their support and encouragement during this journey.

In conclusion, I am immensely thankful for the collaborative and enriching environment provided by the CLUDs Lab, the opportunities presented by the SOUND and TREnD projects, and the support from my supervisor, colleagues, family, and friends. This dissertation would not have been possible without their collective contributions and encouragement.

As a Ph.D. student in urban regeneration, I blend architecture with a commitment to sustainable development. In my final doctoral stages, my research centres on the dynamic interplay within resilient coastal communities, their sustainable transitions, and community development. Beyond academia, my love for travel and diverse connections enhances both my personal life and professional inspiration. Dedicated to positive change, I strive to empower developing countries, fostering a sense of belonging and growth among their citizens.

Nourhan Hamdy

INVESTIGATING AND ANALYSING BLUE ECONOMY IN CALABRIA

Empowering Coastal Communities through Managing Complexity and Fostering Community-based development for Sustainable Transition

Table of Contents

Abstract 11

Sintesi 12

ملخص 13

List of Figures 16

List of Tables 18

Introduction (A preface to a complex story) 19

1. Understanding the Complexity of Cities: Exploring Resilience, Regional Challenges, and Socio-Economic Disparities 29

1.1. Navigating the Complexity of Sustainable Cities: Resilience in Urban Systems *30*

1.2. Community-Based Approaches for Resilient and Sustainable Development *31*

1.2.1. From Deinstitutionalization to Community-Based Urban Development 33

1.2.2. The Italian Policy Approach: Providing the Ground for Community-Based Urban Development 35

1.2.3. A community-based approach to marine resource management 36

1.3. Regional challenges in Resource and Capability Management *37*

1.3.1. The lack of resilient approaches in managing resources and capabilities in certain regions 37

1.3.2. Socio-economic development and regional disparities 39

1.3.3. Italian division 40

1.4. Legal Framework for Sustainable Territorial Development in Calabria: A Comprehensive Analysis of Urban Planning Law *51*

References *58*

2. A Sustainable Blue Economy 69

2.1. Blue Growth: Balancing Economic Growth and Environmental Sustainability for a Sustainable Ocean Economy *70*

2.2. Blue Economy, Green Economy, and SDGs *72*

2.3. A shift from Blue Growth to a Sustainable Blue Economy *74*

2.4. Maritime Spatial Planning: A Holistic Approach for Sustainable Ocean Management *76*

2.5. Ecosystem Services in a Sustainable Blue Economy *80*

2.5.1. The economic valuation of Marine Ecosystem services 81

2.6. The Mediterranean area *83*

2.6.1. Italian Blue Economy 85

2.7. Community-based approach to managing the Blue resources in Italy *91*

References *96*

3. Research Materials and Methods 106

3.1. Research Materials and Methods *107*

3.1.1. The philosophy behind the research design (see figure 12) 107

3.1.2. The case study approach and case selection 109

3.1.3. Multiple research methods 112

References *120*

4. Making sense of findings: results of data analysis 123

4.1. Unlocking the Blue Economy Potential and Challenges *124*

4.2. Blue Growth industries in Calabria *125*

4.2.1. Employment 125

4.2.2. Number of establishments 128

4.2.3. Location Quotient (LQ) 129

4.3. The strategies scenario for Blue Economy *132*

4.3.1. The EU level 132

4.3.2. The national level 132

4.3.3. The regional level 144

4.3.4. Local level 147

References 156

5. Sustainable Blue Economy potential in Calabria (discussion) 157

Gaps and potentials in Calabria's Blue Economy 158

Limitations of the research 188

Blueprint for Sustainable Growth: A Comprehensive Paradigm for Calabria's Blue Economy Development 191

Concluding remarks 198

References 202

6. Conclusion 205

Summary of the study 205

Harmonizing a Sustainable Blue Economy with Marine Ecosystem Services: A Vision Aligned with MSP Principles 210

Recommendations for future research 211

References 215

Appendix 216

Abstract

This research aims to assess the economic potential of Calabria's Blue Economy sectors and establish a foundation for community-driven development in the region. Focused on the sustainable utilization of marine resources, particularly in southern Italy, the investigation explores how regions like Calabria can manage these resources for economic growth based on their unique capabilities. Recognizing the interconnectedness of regions and their territories, the research emphasizes the critical role of effective regional management in fostering resilience and development.

The research underscores the complex nature of urban systems as interdependent systems, emphasizing the pivotal role of resource management in enhancing local well-being, environmental sustainability, and economic prosperity. A significant focus is placed on Blue Economy and its role in sustainable development. Despite the potential benefits from marine resources, some coastal regions lack a resilient approach to managing them, leading to depletion and ecosystem degradation. The study addresses this issue, emphasizing the importance of community-based development for building resilience in coastal territories.

A comprehensive analysis of Calabria's socio-economic context is conducted. The study also evaluates the size and specialization of Blue Growth industries in Calabria. It also assesses strategies related to Blue Economy at different levels - European, national, regional, and local - and examines their alignment. Furthermore, the analysis investigates investments and interventions in the Italian National Recovery and Resilience Plan (PNRR) that align with Blue Economy initiatives. Blue Economy projects at regional and local levels are analysed, emphasizing the role of local action groups in advancing the Blue Economy and marine sectors. Based on the insights derived from the analysis, tailored policies were proposed to facilitate the sustainable development of Calabria, considering its unique challenges and strengths.

This research project employs a data-driven, place-based structural analysis model, offering a practical framework for understanding the dynamics of Blue Growth industries and their potential in the area. The innovation lies in its focus on community-based development and the sustainable Blue Economy, offering practical solutions to the challenges faced by coastal territories with underutilized resources. The ultimate goal is to contribute to the development of strategies and policies supporting vulnerable coastal territories from a sustainable Blue Economy perspective, guiding them towards a prosperous and resilient maritime economy. The findings have the potential to inform urban planners and policymakers in Calabria and beyond, emphasizing the integration of sustainable Blue Economy into urban development strategies to foster resilience and improve the quality of life for urban populations.

Sintesi

Questa ricerca mira a valutare il potenziale economico dei settori della Blue Economy della Calabria e a stabilire una base per lo sviluppo guidato dalla comunità nella regione. Concentrandosi sull'utilizzo sostenibile delle risorse marine, in particolare nel sud Italia, l'indagine esplora come regioni come la Calabria possano gestire tali risorse per la crescita economica basata sulle loro capacità uniche. Riconoscendo l'interconnessione delle regioni e dei loro territori, la ricerca sottolinea il ruolo cruciale di una gestione regionale efficace nel favorire la resilienza e lo sviluppo.

La ricerca evidenzia la complessità dei sistemi urbani come sistemi interdipendenti, sottolineando il ruolo chiave della gestione delle risorse nel migliorare il benessere locale, la sostenibilità ambientale e la prosperità economica. Un focus significativo è posto sulla Blue Economy e sul suo ruolo nello sviluppo sostenibile. Nonostante i potenziali benefici derivanti dalle risorse marine, alcune regioni costiere mancano di un approccio resiliente alla loro gestione, portando a esaurimento e degrado dell'ecosistema. Lo studio affronta questo problema, sottolineando l'importanza dello sviluppo basato sulla comunità per costruire la resilienza nei territori costieri.

È condotta un'analisi completa del contesto socio-economico della Calabria, valutando la dimensione e la specializzazione delle industrie della Blue Growth in Calabria. La ricerca valuta anche le strategie legate alla Blue Economy a livelli diversi - europeo, nazionale, regionale e locale - e ne esamina l'allineamento. Inoltre, l'analisi indaga gli investimenti e le intenzioni nel Piano Nazionale di Ripresa e Resilienza italiano (PNRR) che si allineano con le iniziative della Blue Economy. Progetti di Blue Economy a livello regionale e locale sono analizzati, sottolineando il ruolo dei gruppi d'azione locali nell'avanzare la Blue Economy e i settori marini. Sulla base delle intuizioni derivanti dall'analisi, sono state proposte politiche mirate per facilitare lo sviluppo sostenibile della Calabria, considerando le sue sfide ed i suoi peculiari punti di forza.

Questo progetto di ricerca impiega un modello di analisi strutturale basato sui dati e sul contesto, offrendo un quadro pratico per comprendere le dinamiche delle industrie della Blue Growth e il loro potenziale nella zona. L'innovazione consiste nel suo focus sullo sviluppo basato sulla comunità e sulla Blue Economy sostenibile, offrendo soluzioni pratiche alle sfide affrontate dai territori costieri con risorse sottoutilizzate. L'obiettivo finale è contribuire allo sviluppo di strategie e politiche a sostegno dei territori costieri vulnerabili da una prospettiva di Blue Economy sostenibile, guidandoli verso un'economia marittima prospera e resiliente. I risultati hanno il potenziale di informare urbanisti e legislatori in Calabria e oltre, sottolineando l'importanza dell'integrazione della Blue Economy sostenibile nelle strategie di sviluppo urbano per favorire la resilienza e migliorare la qualità della vita delle popolazioni urbane.

ملخص

يهدف هذا البحث إلى تقييم الإمكانات الاقتصادية لقطاعات الاقتصاد الأزرق في كالابريا وإرساء أسس لتنمية مجتمعية للمنطقة. يركز البحث على الاستخدام المستدام للموارد البحرية، خاصة في جنوب إيطاليا، حيث يستكشف كيف يمكن لمناطق مثل كالابريا إدارة هذه الموارد لتحقيق النمو الاقتصادي استنادًا إلى قدراتها الفريدة. يعترف البحث بترابط المناطق وأراضيها، مؤكدًا الدور الحيوي لإدارة المناطق الفعّالة في تعزيز الصمود والتنمية.
يسلط البحث الضوء على طبيعة الأنظمة الحضرية كأنظمة تعتمد على بعضها البعض، مشددًا على الدور المحوري لإدارة الموارد في تعزيز الرفاه المحلي والاستدامة البيئية والازدهار الاقتصادي. ويركز البحث بشكل كبير على الاقتصاد الأزرق ودوره في التنمية المستدامة. على الرغم من الفوائد المحتملة من الموارد البحرية، تفتقر بعض المناطق الساحلية إلى نهج متين لإدارتها، مما يؤدي إلى استنزاف الموارد وتدهور النظام البيئي.
يتناول البحث هذه المسألة، مؤكدًا على أهمية التنمية القائمة على المجتمع لبناء الصمود في الأراضي الساحلية.
يجري تحليل شامل للسياق الاقتصادي والاجتماعي في كالابريا. يقوم البحث أيضًا بتقييم حجم وتخصص صناعات النمو الأزرق في كالابريا. كما يقوم بتقييم استراتيجيات الاقتصاد الأزرق على مستويات مختلفة - الأوروبية والوطنية والإقليمية والمحلية - ويفحص توجيهاتها. ويستكشف البحث أيضًا الاستثمارات والتدخلات في خطة التي تتناسب مع مبادرات الاقتصاد الأزرق. يتم تحليل مشاريع (PNRR) النهوض الوطنية ومرونة إيطاليا الاقتصاد الأزرق على المستويين الإقليمي والمحلي، مع التركيز على دور مجموعات العمل المحلية في تعزيز الاقتصاد الأزرق وقطاعات البحرية. وبناءً على الرؤى المستمدة من التحليل، تم اقتراح سياسات مخصصة لتيسير التنمية المستدامة في كالابريا، مع مراعاة تحدياتها وقواها الفريدة.
يستخدم هذا مشروع البحث نموذجًا للتحليل الهيكلي قائمًا على البيانات والمكان، يقدم إطارًا عمليًا لفهم ديناميات صناعات النمو الأزرق وإمكانياتها في المنطقة. الابتكار يكمن في التركيز على التنمية القائمة على المجتمع والاقتصاد الأزرق المستدام، مقدمًا حلاً عمليًا للتحديات التي تواجه الأراضي الساحلية ذات الموارد غير المستغلة بشكل كامل. الهدف النهائي هو المساهمة في تطوير استراتيجيات وسياسات تدعم الأراضي الساحلية الضعيفة من منظور اقتصاد أزرق مستدام، موجهة إياها نحو اقتصاد بحري مزدهر وقائم. وتتيح النتائج إمكانية إشراك مخططي المدن وصنّاع السياسات في كالابريا وخارجها، مع التأكيد على دمج الاقتصاد الأزرق المستدام في استراتيجيات التنمية الحضرية لتعزيز الصمود وتحسين جودة الحياة للسكان الحضريين.

A preface to a complex story

CALABRIAN BLUE ECONOMY

40 Enterprises Processing and Preserving of Fish, Crustaceans and Molluscs 2020

1555 Enterprises Freight Transport by Road 2020

131 Enterprises Travel Agency Activities 2020

213 Enterprises Production of Electricity 2020

31 Enterprises Repair and Maintenance of Ships and Boats 2020

55 Enterprises Cargo Handling 2020

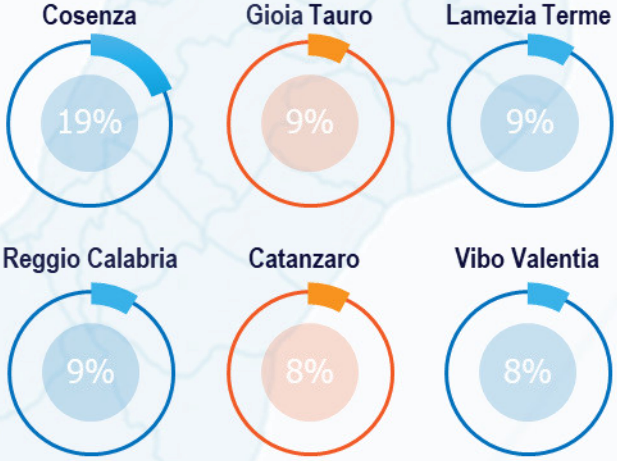
231 Enterprises Technical Testing And Analysis 2020

Research Overview

The research explores ocean-based sectors performance in Calabria, Italy, emphasizing its potential for resilience and economic growth. It advocates for a community-based transition and focuses on the sustainable Blue Economy. This research is following a data-driven place-based structural analysis model. It examines the socio-economic context of Calabria, Blue Growth industries, and the alignment of different levels of governance. The study proposes tailored policies for sustainable development. This research offers practical solutions for regions with underutilized resources, contributing to the literature and informing urban planners and policymakers on integrating the sustainable Blue Economy for resilience and well-being.

Labor Market Areas

The research focus on the concept of local Labor Market Areas (LMAs), which are geographic areas around central cities with a concentration of labour demand. These areas are vital for the performance of clusters and facilitate the easy transfer of knowledge and technology between firms.



The top LMAs in employment size for 2019

CONCEPTUAL FRAMEWORK

RESEARCH QUESTIONS

Main Question
How vulnerable coastal territories can reinforce their local performance towards green transition and resilience-based regeneration?

Sub-Question 1
Can blue economy drive a sustainable and inclusive transition in Calabria?

Sub-Question 2
What are the key characteristics and potentials within Calabria's blue growth industries?

Sub-Question 3
How do European, national, regional, and local authorities contribute to the development of marine complex systems and the blue economy which affect the development in Calabria?

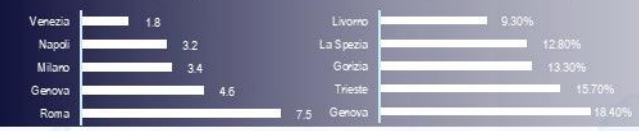
OBJECTIVES

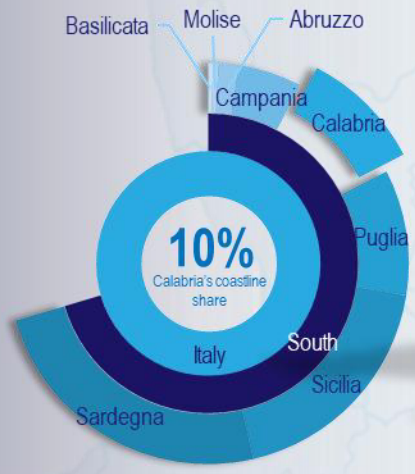
- Understand the Calabrian socioeconomic context
- Focus on the Blue Economy and the characterizations of Blue Growth industries in Calabria
- Identify and analyse the strategies related to Blue Economy on different levels
- Analysing the role of the local action groups in maintaining the community ecosystem,
- Propose a pragmatic and tailored approach to overcome the challenges facing Blue Economy in Calabria.

THE GAP

Does the presence of large amounts of natural resources naturally contribute to the socioeconomic development?

However, Southern regions contribute significantly to the added value of the sea economy in Italy, but in absolute terms, leadership and economic dominance are concentrated in cities in the northern part of the country.





METHODOLOGY

Cluster-based analysis for Blue Growth industries in Calabria. Exploring the interplay between cluster performance variables and the changing features of geographical areas.

A new way of analysing the cross sectorial linkages. Social Network Analysis (SNA) was employed to study Calabria's industry networks. It visualizes the regional Blue Growth industry network structure, highlighting inter-sectoral links.

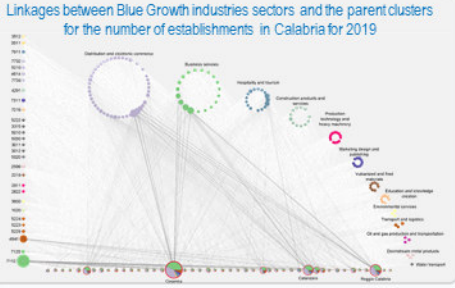
The strategies scenario for Blue Economy on different levels. Understanding blue strategies on different levels to justify and/or spot shortcomings in the development process

Local Action Groups. Comprising a systematic examination of FLAG actions through qualitative data analysis, focusing on identifying patterns, actions, and allocation of resources across different sectors of the blue economy.

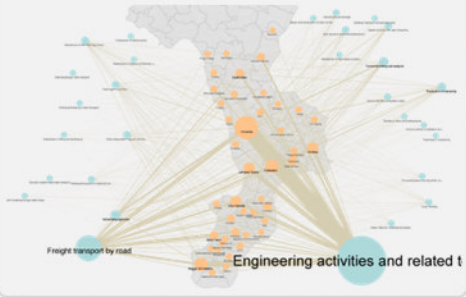
Blue Economy Dashboard for Calabria. An Excel-based dashboard has been developed to provide a comprehensive visualization of the data gathered during the analysis of this research on Blue Economy in Calabria

RESULTS

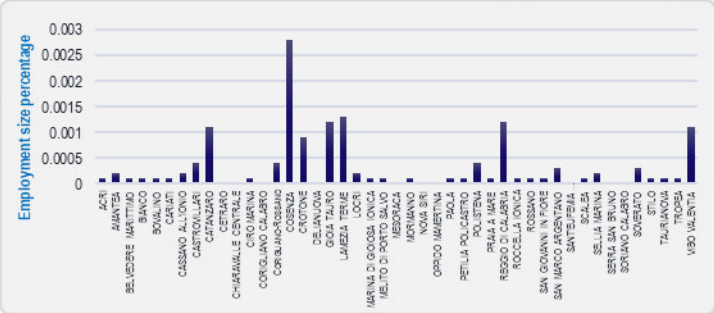
Linkages between Blue Growth industries sectors and the parent clusters for the number of establishments in Calabria for 2019

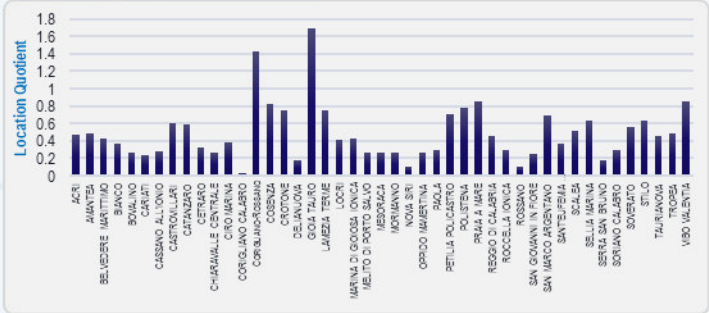


Network of the number of establishments in Blue Growth industries in Calabria for 2019



Network of the employment in Blue Growth industries in Calabria for 2019





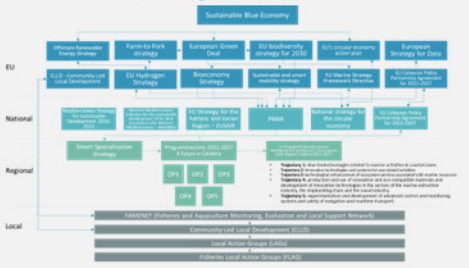
Calabria, with its coastal areas and access to the Mediterranean Sea, holds significant untapped potential for Blue Economy and sustainable development.

The employment average in Calabria for BE Sectors	1.44%

PNRR allocation for BE sectors

12% of the entire plan fund	22 billion euros

Blue Strategies on different levels

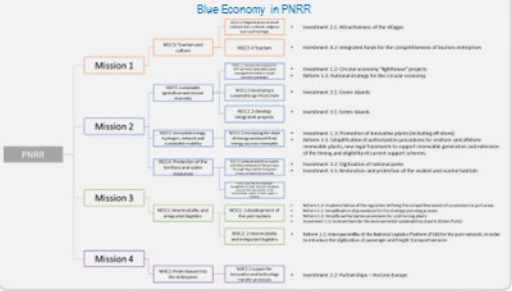


Key facts

There is significant disparity between Calabria's share of Blue Growth industries and the national average. There is limited data for FLAGs actions and plans in Calabria. There is incomplete understanding of the precise contributions of various ecosystem services.

Actions of 2 FLAGs in Calabria

Blue Economy in PNRR



The research is based on data-driven place-based structural analysis model. The territorial economic networks are a valuable tool for understanding interactions in regional systems and economic clusters, revealing local industrial potentials.

FLAGs in Calabria

TAILORED POLICY RECOMMENDATIONS

For areas with high employment potential
Providing training opportunities, promoting entrepreneurship, attracting talent, and improving the attractiveness of careers in the Blue Economy.

For Calabria's share disparity
Enabling environment for business development, including improving infrastructure, access to finance, and regulatory frameworks.

For the shortage of opportunities in emerging sectors
Involving investment incentives, business and start-up Support education and training programs, collaboration, and infrastructure development.

For disparities in economic development within the region
Providing support and incentives for underrepresented sectors in specific LMAs, fostering entrepreneurship and innovation, and promoting skills development and training programs.

For incomplete understanding of ecosystem services
Adopting an ecosystem-based approach in maritime spatial planning, emphasizing accurate monitoring, sustainable resource utilization, ecosystem-based spatial planning, and nature-based solutions.

For Calabria's abundant coastal assets.
Harnessing their potential through sustainable tourism practices and creating accessible and inclusive recreational opportunities for both residents and visitors, guaranteeing equitable enjoyment of Calabria's coastal and marine environment.

List of Figures

Fig. 1. Conceptual Scheme of the Project Approach
Fig. 2. Italy's Regional Landscape: A Dichotomy in Colours
Fig. 3. Sustainable Blue Economy Timeline
Fig. 4. The Italian provinces classified according to the criterion of coastal regions (in blue the provinces with a border on the sea and in green those that have at least 50% of the population within 50 km of the coastline).
Fig. 5. Contribution to EU Blue Economy (2018)
Fig. 6. Italy's Blue Economy for territories (InforMare, 2022)
Fig. 7. 2020 Regional Ranking: Maritime Economy's Impact on Value added Percentage
Fig. 8. 2020 Regional Ranking: Maritime Economy's Impact on Employment Percentage
Fig. 9. Top 5 Provinces by absolute value (in billions €)
Fig. 10. Top 5 Provinces by % incidence on the total provincial economy
Fig. 11. FLAGs in Calabria
Fig. 12. Methodological Framework for Analysing Blue Economy in Calabria: From Cluster Identification to Sustainable Growth Strategies
Fig. 13. LMAs in Calabria
Fig. 14. Geographic GDP Segmentation in Italy (2019) in thousand euros
Fig. 15. Linkages between Blue Growth industries sectors and the parent clusters for the number of establishments in Calabria for 2019
Fig. 16. Network of the average employment in Blue Growth industries in Calabria for 2019
Fig. 17. Network of the number of establishments in Blue Growth industries in Calabria for 2019
Fig. 18. Proportion of Projects Classified as Blue Within Overall Project Portfolios in These Policies
Fig. 19. Hierarchical Framework for Strategies related to Blue Economy: EU to Local Perspectives
Fig. 20. A snapshot of Blue Economy in Calabria Dashboard
Fig. 21. Time-Stamped Blue Growth: EU Strategies Related to Blue Economy Mapped in Chronological Order
Fig. 22. Distribution of the total primary energy supply in Italy in 2021, by energy source
Fig. 23. PNRR Missions, Investments, and Reforms Driving National Blue Economy Goals
Fig. 24. Sequential Ecosystem assessment Process Following the Extended SEEA-EA Methodology by (De Valck et al., 2023) but with FNP Framework Substituted by Interviews
Fig. 25. Sequential Ecosystem assessment Process Following the Extended SEEA-EA Methodology by (De Valck et al., 2023) but with FNP Framework Substituted by Interviews

List of Tables

Table 1. UN SDGs (United Nations) addressed by the topic under investigation
Table 2. Italy's Contribution to EU Added Value (Maritime Sectors, 2018)
Table 3. Strategies and Objectives of FLAGs in Calabria
Table 4. Individual and family relative poverty rate in Southern Italian "less developed regions" (Istat, 2020)
Table 5. Gross domestic product (source, Eurostat 2021) in Southern Italian Regions—less developed regions (Eurostat)
Table 6. Local Labour Market Areas' population in 2019 (ISTAT, 2019)
Table 7. Sectors in Blue Growth industries as was classified in the Statistical Classification of Economic Activities in the European Community (NACE), which are cutting across different clusters
Table 8. Data frame structure
Table 9. Criteria for Evaluating Frameworks
Table 10. Criteria to classify the link intensity between PNRR interventions and BE sectors
Table 11. Employment size in Calabria's LMAs for 2019
Table 12. Location Quotient for LMAs in Calabria Region for 2019
Table 13. Key Features and Contributions of selected-EU Strategies related to Blue Economy
Table 14. Examination of Linked Investments and Reforms in PNRR Contributing to BE
Table 15. Calabria's Policy Objectives Aligned with Blue Economy Goals
Table 16. Projects related to BE financed by the 2014-2020 cohesion policy
Table 17. Actions of 3 FLAGs in Calabria

Introduction (A preface to a complex story)

The aim of this research is to assess and observe the economic possibilities associated with Calabria's marine resources, establishing a vital groundwork for community-driven progress in the area. The research focuses on investigating if regions in southern Italy, in particular Calabria, are effectively utilizing their marine resources for their economic growth and exploring how they could manage these resources in a sustainable and resilient manner. By utilizing a community-based approach and promoting self-sufficiency and sustainability, regions and cities can build resilience and promote economic growth while preserving the environment and achieving social inclusion.

It is important to note that the focus on regions is significant as it directly impacts the cities within those regions (Fawn, 2009). Regions serve as the broader context within which cities operate and develop. The effective management and utilization of marine resources at the regional level can have direct implications for the cities within that region. Regional strategies and policies can influence the economic opportunities, resource allocation, and overall resilience of cities. Therefore, understanding and addressing the challenges and opportunities at the regional level is crucial for fostering sustainable development and resilience in cities.

In today's rapidly changing world, cities are facing unprecedented challenges and stresses that threaten their well-being and sustainability transition. The increasing frequency and intensity of natural disasters, the impact of climate change, and the growing population density are just a few of the many shocks and stresses that cities must contend with (Sachs, 2015a). To address the challenges and stresses faced by cities, an important aspect is transitioning towards a green and sustainable future. Green transition refers to the shift towards environmentally friendly practices and technologies that minimize carbon emissions, promote renewable energy sources, and prioritize ecological preservation. It involves adopting sustainable policies and practices across various sectors, including transportation, energy, waste management, and urban planning (McDowall & Ekins, 2014). Moreover, building resilience can help mitigate these challenges. It has been widely recognized by scholars and policymakers as a crucial approach to effectively address and overcome these complex urban issues.

A lack of resilience can exacerbate vulnerabilities within a city or territory (Brunetta et al., 2019). It means that they are less prepared to cope with and recover from these challenges, resulting in greater social, economic, and environmental impacts. Vulnerabilities can manifest in different ways, such as increased poverty, social inequality, infrastructure deficiencies, environmental degradation, or limited access to resources and services (Proag, 2014). In this research, it is believed that resilience-building strategies and community-based approaches can contribute to the green transition by fostering sustainable development and reducing vulnerabilities in cities.

Researchers have conceptualized cities as complex systems with multiple interconnected subsystems that enable them to adapt to and recover from disturbances (Portugali, 2016). The concept of a city as a complex system is not solely derived from its material components, but it also takes into account its human components which interact with each other (Portugali, 2016). While the material components alone make the city a simple system, it is the actions and interactions of the city dwellers that transform the city into a complex artificial system. The city, therefore, can be described as a hybrid simple-complex system. Once the city emerges, its structure and dynamics influence the behaviour of its inhabitants in a circular

causality manner, leading to socio-spatial reproduction. Moreover, the city functions as both an environment for its inhabitants and users, interacting with its surroundings, and as an environment for the large population that resides within it. As cities continue to grow and urbanization increases, the city becomes an increasingly prominent complex environment.

The complex system is characterized by resiliency and ability to withstand and recover from shocks and stresses (Fraccascia et al., 2018a). In the context of cities, resilience requires effective management of the many subsystems that make up a city, including transportation, housing, energy, water, and waste management, among others (Rybski & González, 2022). Each of these subsystems is interconnected and depends on the others to function effectively. Nevertheless, in the event of a collapse of one subsystem, the others should be able to continue functioning to maintain the overall resilience of the system (Folke et al., 2010).

Effective management of city subsystems requires an awareness of their capabilities and resources, as well as a recognition of the importance of community-based approaches to sustainable development (Folke et al., 2004). The community-based development approach emphasizes community involvement in decision-making and management, leveraging local knowledge and resources to achieve effective implementation of initiatives. This involves a focus on self-sufficiency and sustainability, utilizing local skills and resources to promote economic growth and social inclusion without exploiting the environment.

Various approaches can be taken to accomplish this. For instance, Agenda 2030 emphasizes the preservation of natural local resources as a key component of sustainable development (United Nations, 2015b). Natural resources play a vital role in enhancing resilience in cities (Bush & Doyon, 2019). They provide essential ecosystem services such as clean air and water, climate regulation, and biodiversity. These natural elements help mitigate the impacts of climate change, reduce urban heat island effects, enhance water management, and provide recreational spaces for residents.

Blue Economy (BE), which refers to the sustainable use of marine resources for economic growth, is also seen as a critical factor in achieving the sustainable development goals, reducing inequality, and building resilience at all levels, including the local level (World Bank Group, 2017). BE is seen as a complex system of interactions and interdependencies between anthropogenic economic activities, the marine ecosystems, and biodiversity (European Commission et al., 2022).

Despite the importance of managing BE, some cities or territories, in particular coastal ones, lack a resilient approach to managing their Blue resources, leading to the depletion of marine resources and the degradation of the ocean ecosystem (Drosou et al., 2019). This is a critical issue that needs to be addressed as the sustainable management of blue resources can contribute significantly to building resilient communities.

Several studies have investigated the importance of the sustainable BE and community-based development for building resilience in coastal territories. For instance, Evans et al. (2023) outline the barriers to and enablers of community engagement in a sustainable BE, while Lee et al. (2020) highlight the potential of the BE in achieving sustainable development goals. Additionally, Folke et al. (2004) discuss the role of resilience in maintaining ecosystem services, which are essential for human well-being.

The problem this research seeks to address is the inability of some cities to utilize their capabilities and manage their resources for their socioeconomic growth. The study

focuses on territories in Southern Italy which have long suffered from economic problems and underdevelopment due to the enduring Italian North-South divide. Asso (2021) describes the gap between northen and southern regions in Italy as huge, persistent, and increasing, while Carmelo & Gaetano (2019) argue that national economic policy has disinvested from the South, leading to the illusion that the stronger part of the country can do it alone.

Southern Italy is blessed with a myriad of regions that boast close proximity to the sea, creating a wealth of opportunities for the utilization of its abundant blue resources and thriving marine ecosystems. This coastal proximity provides an ideal environment for various marine activities, including fishing, aquaculture, and tourism. It is crucial to recognize and harness the potential of these resources responsibly, ensuring their sustainable management and preservation, thus guaranteeing the long-term prosperity of both the communities and the precious marine ecosystems of southern Italy.

Given the importance of sustainable BE and the need for resilient approaches to city management and that cities and regions have a symbiotic relationship, where the success and development of regions contribute to the overall growth and prosperity of cities, and vice versa. This research focuses on investigating if territories within Calabria region in southern Italy are utilizing their resources as well as exploring how they could manage these resources in a sustainable and resilient manner. The quality of life, infrastructure, and resources available in the region directly impact the livability, functionality, and resilience of cities within it. It is believed that by utilizing a community-based approach and promoting self-sufficiency and sustainability, cities can build resilience and promote economic growth while preserving the environment and achieving social inclusion. This research will contribute to the development of tailored strategies and policy recommendations to support sustainable BE in and within Calabria and promote resilient approaches to local management (see figure 1 for schematic representation of research concepts).

The hypothesis guiding this study is that the presence of large amounts of natural resources does not necessarily contribute to the socioeconomic development if they are not managed properly. To explore this hypothesis, the research seeks to answer a main question; How vulnerable territories can reinforce their local performance towards green transition and resilience-based regeneration? And three sub-questions, namely, Can Blue Economy drive a sustainable and inclusive transition in Calabria? What are the key characteristics and potentials within Calabria's Blue Growth industries? And How do European, national, regional, and local authorities contribute to the development of marine complex systems and the Blue Economy which affect the development in Calabria?

Calabria in Southern Italy is an economically disadvantaged region where comprehensive and resilient approaches to managing BE and marine resources are lacking. While the importance of sustainable development and community-based approaches is recognized, there may be limited research specifically focusing on how territories in such regions are utilizing their resources and managing them in a sustainable and resilient manner (Least Developed Countries Expert Group, 2018).

This research seeks to fill this gap by investigating if areas within Calabria is effectively utilizing its marine resources and exploring how they could manage these resources in a sustainable and resilient way by promoting a community-based approach aligned with the area's needs.

Any coastal region is endowed with thriving marine ecosystems that provide a wide range of essential services to both the environment and local communities. Marine ecosystem services play a vital role in supporting human well-being, ecological balance, and economic prosperity (W. J. Evans, 2008). These services include but are not limited to: biodiversity and fisheries, climate regulation, tourism and recreation, water quality, nutrient cycling, and research and education (Reid et al., 2005).

Despite their significant contributions to human well-being and prosperity, marine ecosystem services are vulnerable to various threats, including overfishing, habitat destruction, pollution, and the impacts of climate change (Arrigo et al., 2020; K. Zhang et al., 2020). The sustainable management of BE in Calabria must prioritize the preservation and enhancement of marine ecosystem services to ensure the long-term resilience and prosperity of the region.

It is vital to take into consideration marine ecosystem services in mainstream decision-making processes (Fisher et al., 2009). It is important to highlight the need to protect and sustainably utilize these resources in the context of community-driven progress in Southern Italy.

Fig. 1. Conceptual Scheme of the Project Approach

By focusing on the specific context of Calabria and examining the interplay between community-based approaches and the management of blue resources, this research seeks to contribute to the knowledge and understanding of how cities can effectively utilize their capabilities and resources to promote economic growth, social inclusion, and environmental sustainability in economically disadvantaged regions.

To achieve the research aim, the research has five specific objectives;

- understand the Calabrian socioeconomic context,
- focus on the Blue Economy and the characterizations of Blue Growth industries in Calabria,
- identify and analyze the strategies related to Blue Economy on different levels,
- analysing the role of the local action groups in maintaining the community ecosystem,

- and propose a pragmatic and tailored approach to overcome the challenges facing Blue Economy in Calabria.

The thesis, first, conducts thorough research on Calabria's socio-economic context such as demographics, and economic indicators, such as employment rates, income levels, industry sectors, and education levels and analyses them to identify key patterns, trends, and areas for potential development. Second, analyses the inter-sectoral relationships within the context of Calabria's BE to evaluate the blue sectors' economic size and their specialization within Calabria. Industry cluster analysis is introduced as a way to examine the spatial configuration of the blue sectors and their performance within the region. The study focuses on Blue Growth industries, which cover 33 sectors, and their performance in the Calabria region. By investigating the regional characteristics and intersectoral linkages within the Blue Growth industries and by using cluster-based analysis to better understand the interconnections between different sectors within the industries, the study sheds light on the potential for these industries to sustain the region's economic development. The study adopts size and specialisation measures, including employment, establishments, and LQ (Location Quotient). Local Labour Markets Areas (LMA) are highlighted as a crucial spatial element in the performance of a cluster. The study uses data from 2019 and calculates LQ to identify the extent to which clusters have achieved their specialisation. The findings offer new insights into Blue Growth industries' size and specialization in Calabria, and the gaps and potentials in the exciting Blue sectors.

Additionally, Spatial Network Analysis (SNA) was used to study the networks of industries in Calabria. SNA is a valuable tool for understanding the complexity of the system, particularly the relationships between different sectors and their impact. This approach helps map out the structure of regional Blue Growth industries, highlighting the connections between sectors in each LMA. The analysis creates a network graph with nodes representing LMAs and sectors, connected by edges that signify the presence of industrial sectors within LMAs. This allows for the examination of relationships between location and sectors, assessing their strength.

Moreover, the study outlines a methodology for analysing strategies related to BE at different levels. A number of strategies were reviewed, and Multi Criteria analysis was used to prioritize them. Some strategies were then further analysed. This is important to identify links between strategies at all levels in order to provide a comprehensive network of BE strategies and assess if the strategies are aligned with each other while also taking into account the geographic context.

Subsequently, investments ad interventions in the National Recovery and Resilience Plan (PNRR, Italian acronyms) aligned with BE's initiatives were identified and outlined. Subsequent to this identification, an in-depth exploration of projects related to BE was undertaken, focusing on both regional and local levels. To facilitate this exploration, platforms such as Kohesio and OpenCoesione were utilized, enabling comprehensive analysis and assessment of the aforementioned projects.

The subsequent procedures entailed an examination of the local action groups and their endeavours in facilitating the advancement of BE and marine sectors.

In the subsequent stages, the focus will be on constructing a comprehensive dashboard that consolidates relevant data and key indicators to assess the current state of development in Calabria. Furthermore, based on the insights gained from the overall analysis, tailored policies will be proposed to foster the sustainable development of Calabria. These policies will take into account the specific challenges and opportunities faced by the region. Moreover, the policies will target to leverage Calabria's unique

strengths and resources. The goal is to help Calabria embark on a path of inclusive and sustainable development, unlocking its full potential and improving the quality of life for its inhabitants.

The idea of conceptualizing a city as a complex system with multiple interconnected subsystems is not new. However, the application of this concept to the management of a city's blue resources in a sustainable and community-based manner is innovative. By emphasizing the importance of the BE, which includes sustainable use of oceans, seas, coasts, and waterways, the research presents a unique approach to addressing shocks and stresses in cities. Additionally, recognizing the unique strengths, knowledge, and assets present within a particular region. It acknowledges that sustainable growth is not solely dependent on external factors but can be fostered through leveraging the existing resources and skills within the community itself. The research fills a gap in the literature by highlighting the lack of resilient approaches to managing blue resources in many territories and proposing a practical and tailored solution.

Furthermore, one of the research's innovations lie in its comprehensive evaluation of strategies related to BE at multiple levels, including the European, national, regional, and local levels. The strategy analysis approach employed in the research is an effective method for justifying the local path to the development of BE sectors with respect to the entire system. The study's findings have the potential to result in higher regional utilization of natural resources while keeping them on the path of sustainable development goals.

Through this research, the foundation has been laid for an understanding of the economic possibilities associated with Calabria's marine resources and the challenges of sustainable development in this region. The significance of the BE and its relationship to the resilience and prosperity of cities and regions has been identified. While the potential and challenges have been discerned, the critical question is how to transform this knowledge into practical solutions.

This is where Maritime Spatial Planning (MSP) enters the picture. The research findings have recognized the economic opportunities and vulnerabilities within Calabria's Blue Growth industries, and it is firmly believed that MSP is the key to translating these findings into action. MSP offers a strategic framework for addressing economic disparities, promoting sector integration, and encouraging community-based approaches to development. MSP can be applied as the bridge between insightful analysis and practical implementation, driving the sustainable management of marine resources, sector integration, and the fostering of community resilience.

In the following sections of this thesis, a deeper exploration will be undertaken into the specific strategies, analysis, and policies that form the backbone of this research. The ultimate goal is to contribute to the development of tailored strategies and policy recommendations to support the sustainable BE in Calabria and promote resilient approaches to local management. As this journey is undertaken, it is hoped that this research can serve as a guiding light toward a more prosperous and resilient maritime economy in Calabria.

The thesis consists of the following six chapters:

Chapter 1 focuses on providing a comprehensive literature review. It begins by discussing the concept of a city as a complex system, emphasizing the interconnectedness and interdependencies of various elements within urban environments. The concept of resilience cities and a community-based approach is then introduced, highlighting the importance of empowering local communities in building resilience. The chapter also delves into regional challenges, specifically addressing the

lack of a resilient approach in managing resources and capabilities in certain regions. To explore this further, the socio-economic development theory is discussed, along with an examination of regional disparities. The thesis zooms in on the Italian context, particularly the division between Northern and Southern Italy in order to understand the lagging growth of southern Italian cities and the socio-economic and socio-ecological aspects specific to the South, with a focus on Calabria.

Chapter 2 delves into the concept of BE as a critical approach to reducing inequality, building resilience, and achieving sustainable development at all levels, including the local level. The shift from Blue Growth to a Sustainable BE is explored, along with its potential for long-term sustainable development. Within this transformative shift, Maritime Spatial Planning (MSP) is explored as a comprehensive strategy for sustainable ocean management. The thesis also reviews the concept of ecosystem services within a Sustainable BE and highlights the economic valuation of marine ecosystem services. Additionally, the chapter highlights the relationship between the BE and the Sustainable Development Goals (SDGs). The chapter also explores the EU's strategies related to BE, as well as the significance of the Mediterranean and surrounding seas in the context of BE. The thesis then narrows its focus to the Italian context, discussing the inclusion of BE in PNRR and exploring the specificities of the Southern Italy BE. Finally, the chapter emphasizes the importance of a community-based approach to managing Blue resources.

Chapter 3 presents the design of the methodological framework applied to provide a better understanding of the BE's performance in Calabria and the heterogeneity of the industries in the region. It examines the Blue Growth industries in Calabria, introducing a new way of analyzing cross-sectorial linkages. Moreover, the chapter shows the strategies perform on different levels to justify (or not) the local path of the development of the sectors with respect to the whole system. Lastly, it assesses local action groups.

Chapter 4 presents the findings from the analysis. It unveils essential insights into various facets of the region's economic landscape, including a declining population and disparities in GDP per capita. The chapter delves into employment dynamics and structural characteristics within Calabria's Blue Growth sectors, providing valuable information on the size and specialization of LMAs and the impact of firms on the regional economy. Furthermore, it sheds light on the results of the analysis of strategies related to BE at different levels, emphasizing the interconnectedness and the imperative for effective coordination at EU, regional, and local levels. The distribution and impact of Blue projects funded by the cohesion policy in Calabria are also presented. Additionally, the chapter explores the actions undertaken by FLAGs (Fisheries Local Action Groups) in Calabria to understand the initiatives implemented in their plans. The findings are synthesized and presented, providing a comprehensive understanding of the research outcomes.

Chapter 5 focuses on discussing the potential of the BE. It emphasizes the importance of estimating the contribution of the oceans to local economies, highlighting the significance of the BE in Calabria. The chapter identifies gaps and potentials within Calabria's BE and explores the limitations of the research conducted. It also has a proposed paradigm and tailored approach to overcome the challenges facing BE in Calabria.

Chapter 6 serves as a conclusion, summarizing the study's key points and findings. It provides a comprehensive overview of the research conducted, emphasizing its implications for both theory and practice. The chapter discusses what the findings

might mean for individuals working in this field of study and offers recommendations for future research. Ultimately, this chapter aims to bring the thesis to a close, tying together all the elements explored throughout the research. Finally, a number of points about the strengths and limitations of the research were raised along with proposals for future work.

References

Arrigo, K. R., van Dijken, G. L., Cameron, M. A., van der Grient, J., Wedding, L. M., Hazen, L., Leape, J., Leonard, G., Merkl, A., & Micheli, F. (2020). Synergistic interactions among growing stressors increase risk to an Arctic ecosystem. Nature Communications, 11(1), 6255.

Asso, P. F. (2021). New perspectives on old inequalities: Italy's north–south divide. Territory, Politics, Governance, 9(3), 346–364.

Brunetta, G., Ceravolo, R., Barbieri, C. A., Borghini, A., de Carlo, F., Mela, A., Beltramo, S., Longhi, A., De Lucia, G., & Ferraris, S. (2019). Territorial resilience: Toward a proactive meaning for spatial planning. Sustainability, 11(8), 2286.

Bush, J., & Doyon, A. (2019). Building urban resilience with nature-based solutions: How can urban planning contribute? Cities, 95, 102483.

Carmelo, P., & Gaetano, V. (2019). Europe-Italy, North-South: The Double Gap. Rivista Economica Del Mezzogiorno, 3–4, 673–687.

Drosou, N., Soetanto, R., Hermawan, F., Chmutina, K., Bosher, L., & Hatmoko, J. U. D. (2019). Key factors influencing wider adoption of blue–green infrastructure in developing cities. Water, 11(6), 1234.

European Commission, Directorate-General for Maritime Affairs and Fisheries, Joint Research Centre, Addamo, A., Calvo Santos, A., & Guillén, J. (2022). The EU blue economy report 2022. Publications Office of the European Union. https://data.europa.eu/doi/10.2771/793264

Evans, L. S., Buchan, P. M., Fortnam, M., Honig, M., & Heaps, L. (2023). Putting coastal communities at the center of a sustainable blue economy: A review of risks, opportunities, and strategies. Frontiers in Political Science, 4.

Evans, W. J. (2008). Coastal and Marine Resources. Environment Department. Annual Review: July 2007-June 2008 (FY08), 4–5.

Fawn, R. (2009). 'Regions' and their study: Wherefrom, what for and whereto? Review of International Studies, 35(S1), 5–34.

Fisher, B., Turner, R. K., & Morling, P. (2009). Defining and classifying ecosystem services for decision making. Ecological Economics, 68(3), 643–653.

Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. Ecology and Society, 15(4).

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L., & Holling, C. S. (2004). Regime shifts, resilience, and biodiversity in ecosystem management. Annu. Rev. Ecol. Evol. Syst., 35, 557–581.

Fraccascia, L., Giannoccaro, I., & Albino, V. (2018). Resilience of complex systems: State of the art and directions for future research. Complexity, 2018.

Least Developed Countries Expert Group. (2018). Considerations regarding vulnerable groups, communities and ecosystems in the context of the national adaptation plans. UNFCCC, Dec.

Lee, K.-H., Noh, J., & Khim, J. S. (2020). The Blue Economy and the United Nations' sustainable development goals: Challenges and opportunities. Environment International, 137, 105528.

McDowall, W. A. S., & Ekins, P. (2014). Green innovation: Industrial policy for a low carbon future.

Portugali, J. (2016). What makes cities complex? Complexity, Cognition, Urban Planning and Design: Post-Proceedings of the 2nd Delft International Conference, 3–19.

Proag, V. (2014). The concept of vulnerability and resilience. Procedia Economics and Finance, 18, 369–376.

Reid, W. V., Mooney, H. A., Cropper, A., Capistrano, D., Carpenter, S. R., Chopra, K., Dasgupta, P., Dietz, T., Duraiappah, A. K., & Hassan, R. (2005). Ecosystems and human well-being-Synthesis: A report of the Millennium Ecosystem Assessment. Island Press.

Rybski, D., & González, M. C. (2022). Cities as complex systems—Collection overview. Plos One, 17(2), e0262964.

Sachs, J. D. (2015). The age of sustainable development. In The Age of Sustainable Development. Columbia University Press.

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs. https://sdgs.un.org/2030agenda

World Bank Group. (2017). The Potential of the Blue Economy—Increasing Long-term Benefits of the Sustainable Use of Marine Resources for SIDS and Coastal Least Developed Countries .:. Sustainable Development Knowledge Platform. https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=2446&menu=1515

Zhang, K., Cai, Y., Liao, B., Jiang, Y., Sun, M., Su, L., & Chen, Z. (2020). Population dynamics of threadfin porgy Evynnis cardinalis, an endangered species on the IUCN red list in the Beibu Gulf, South China Sea. Journal of Fish Biology, 97(2), 479–489.

1. Understanding the Complexity of Cities: Exploring Resilience, Regional Challenges, and Socio-Economic Disparities

Abstract

Cities are intricate tapestries of human activity, constantly evolving as complex systems where the interplay of diverse elements is key to their vitality. To foster sustainable growth and resilience in cities, a community-based approach becomes indispensable. By actively engaging residents and stakeholders, cities can harness local knowledge and expertise to tailor socio-economic development initiatives that address unique challenges and opportunities within their neighbourhoods. This grassroots involvement not only bolsters social cohesion but also ensures that urban development efforts are rooted in the needs and aspirations of the very communities they serve, thereby enhancing the city's resilience in the face of dynamic challenges. In this way, cities transform into living organisms, adapting and thriving as they navigate the complexities of modern urban life. This chapter examines these concepts in-depth, shedding light on how a community-based approach to socio-economic development can enhance the resilience of cities as complex, ever-evolving systems. Furthermore, the chapter shifts its focus to the Italian context, delving into Italy's national disparities and placing particular emphasis on the formidable challenges faced by its southern regions.

1.1. Navigating the Complexity of Sustainable Cities: Resilience in Urban Systems

The widespread discussion on sustainable cities emphasizes the importance of adopting a long-term strategic approach to create a regional context where sustainable development becomes the standard (Blasi et al., 2022). Wheeler defines sustainability as a comprehensive, forward-thinking planning approach and outlines key policy directions such as compact urban design, reduced reliance on automobiles, ecosystem preservation, and improved equity (Wheeler, 2000). Sustainable city initiatives began to emerge worldwide at the end of the 20th century (Wheeler, 2000).

The introduction of the concept of "resilience" in urban policy has reshaped the imperatives of sustainability, particularly in the face of environmental crises (Sharifi & Yamagata, 2022; Zeng et al., 2022). The current discourse on resilient sustainability underscores the idea that cities should be environmentally friendly but also require significant innovations (Ahern, 2011). It is evident that cities pose a significant challenge to sustainable development due to increasing population density and high energy consumption. Moreover, the complex urban environment, especially in metropolitan areas, presents challenges in the transition toward sustainability.

The notion of a city as a complex system has gained significant attention in various academic disciplines, including urban planning, geography, and complexity science (Portugali et al., 2012). The foundation of the concept of cities as complex systems lies in complexity theory, which provides a framework for studying intricate interactions and emergent behaviours in diverse systems (Batty & Marshall, 2012). Batty (2007) argues that cities can be regarded as complex adaptive systems, characterized by nonlinear dynamics, interconnectedness, feedback loops, and self-organization. The understanding of cities as complex systems is further enriched by considering concepts like emergence, scale, and nonlinearity, as emphasized by Portugali et al. (2012).

Cities exhibit self-organizing processes where local interactions among various urban elements give rise to global patterns and emergent properties. In her seminal work, Jacobs (1961) proposed that cities thrive on the diversity of economic and social activities, fostering innovation and creativity. This perspective aligns with complexity theory, highlighting the emergence of urban phenomena such as agglomeration economies, knowledge spillovers, and urban resilience (Bettencourt et al., 2007; Holland & Sigmund, 1995).

Cities can be conceptualized as complex networks, with interactions and flows occurring across various scales and dimensions. The network perspective provides insights into urban connectivity, transportation systems, social networks, and information flows (Barthélemy, 2011). Research by Newman (2003) and Albert and Barabási (2002) demonstrates that cities exhibit scale-free characteristics, wherein a few influential nodes play a crucial role in shaping urban dynamics.

In light of the intricate nature of cities, effective planning is of paramount importance to enhance their resilience, defined as the capacity to anticipate and adapt to uncertainties (Portugali, 2021). Territories face a growing array of unexpected disruptions and pressures, which heighten their susceptibility to vulnerabilities and impede the sustainability of economic and social progress (Eraydin & Taşan-Kok, 2013a). While the idea of resilience is not entirely new in the realm of urban planning, there are challenges in putting it into practical use within the urban context (Chelleri et al., 2015).

Advances in computational modelling and simulation have allowed scholars to explore the dynamics of cities as complex systems. Cellular automata, agent-based models,

and network models have been employed to simulate urban growth, land-use patterns, and transportation systems (Batty, 2008; Bevilacqua, Pizzimenti, et al., 2022). These modelling approaches enable the exploration of various scenarios and provide valuable insights into urban planning and policy-making processes.

In this research, Social Network Analysis (SNA) is applied to trace complexity within the region. A network was formed a by considering economic sectors within industry clusters in a specific territory as nodes.

However, some lagging regions lack technological capabilities to access essential services and economic opportunities (Farole et al., 2018). Bridging the technological gap in these areas is crucial for reducing economic disparities and improving overall quality of life for residents. This thesis investigates the level of complexity of the local economic structure within one of the lagging regions in Europe. It is believed that transition begins and occurs at the local level (Eraydin, 2012; Geels & Schot, 2007; OECD, 2015). The combination of city-level decision making, local stakeholder engagement, and dense populations means that these types of settings can provide ideal testbeds in which innovations are aimed at enhancing sustainable growth and inclusive growth can be piloted (European Commission; Joint Research Centre., 2020). Thus, the concept of granularity was adapted in the study to observe, in detail, the pieces of the economic structure that a region can take as a basis for smart specialization (FORAY & GOENAGA, 2013).

In this project, it is argued that, in order to achieve sustainability and resilience, the system can no longer be "locked into" a particular trajectory of economic development (Garud et al., 2010; Simmie, 2012). Hence, it is argued that new technological pathways that deviate from past practices and attempt to deploy new technologies should be implemented (Balland & Boschma, 2021b). These complex systems contain unexpected properties and often respond in a nonlinear manner to shocks or changes (Balland & Boschma, 2021b). The systems should self-organize, learn, and adapt to shocks to direct this complexity towards new sustainable trajectories (Loorbach & Rotmans, 2010); in other words, systems should become "resilient" (Balland & Boschma, 2021a; Davoudi et al., 2012, 2013; Hidalgo, 2021).

The concept of resilience is closely linked to the understanding of cities as complex systems (Fraccascia et al., 2018b). Resilience emphasizes the ability of cities to adapt, withstand shocks, and recover from disturbances while maintaining essential functions (Dahms, 2010; Park et al., 2013). Urban resilience requires a systemic perspective that considers social, economic, and environmental dimensions, recognizing the interdependencies and feedback loops within cities (Labaka et al., 2019).

In conclusion, the concept of cities as complex systems, informed by complexity theory and various modelling techniques, provides valuable insights into the dynamics, adaptability, and resilience of urban environments. These insights are crucial for addressing urban challenges and promoting sustainable development. The next section will delve deeper into the concept of resilience and how local approaches, such as community-based development, can enhance a city's resilience. This comprehensive understanding of complexity in cities informs urban planning and policy decisions, helping cities thrive and adapt in an ever-changing world.

1.2. Community-Based Approaches for Resilient and Sustainable Development

Resilient and sustainable development is a critical global imperative in an era marked by environmental challenges, economic disparities, and social inequalities. In this context, community-based approaches have emerged as a powerful strategy to

achieve both resilience and sustainability. These approaches empower local communities to take an active role in shaping their own development, making them key stakeholders in the process.

The current severe challenges, such as climate change and the pandemic outbreak, have pushed cities to rethink urban development strategies by addressing their persistent social, economic, and environmental vulnerabilities in the transition towards resilience and sustainability (Eraydin, 2012). Some of the shocks or stresses affecting our cities are difficult to predict, and others result from the persistent vulnerabilities (OECD, 2021).

The OECD (2021) has reported the lessons learned from the consequences of the pandemic and the response of cities across the world in the short- and long-term perspective, which can inform the revision of future urban policy: digital divide, urban mobility, urban density, urban planning and design, and collaborative governance. The current policy approach for recovering from the pandemic, as outlined by the European Commission, has three main goals: to make cities and regions more environmentally friendly (green), technologically advanced (digital), and better prepared to face future challenges (resilient) (European Commission). To achieve these goals, it is important to pay attention to the changing needs of local communities. This means that recovery efforts should be customized to fit the unique circumstances and demands of different cities and regions. In this direction, as also revealed in the context of COVID-19, the importance of engaging urban stakeholders and citizens towards community-based urban development is gaining relevance (CBUPT, 2012).

Community-based approaches emphasize active participation at all stages of development. From the initial planning and implementation to monitoring and evaluation, inclusive decision-making is a key element. This inclusivity ensures that the development projects are well-suited to the community's specific needs and context and fosters a sense of ownership and commitment among community members. As a result, these initiatives become more sustainable because the community itself is motivated to see them succeed.

Furthermore, community-based approaches are acknowledging the unique nature of each community. They promote solutions that are tailored to the specific social, cultural, and environmental contexts of a given area. Rather than applying a one-size-fits-all model, these approaches encourage a deep understanding of the community's distinct characteristics and challenges, ensuring that development interventions are relevant and effective. The approach also takes a holistic view of development. They recognize that development should not be limited to economic growth but should encompass social and environmental aspects as well.

The EU and national policy efforts towards community-based development are rooted in the policy shift towards deinstitutionalizing public services (Friscic, 2023). Despite their numerous advantages, community-based approaches do come with challenges. One of the primary hurdles is the capacity and skills of communities. Some regions are still finding difficulties in operationalizing comprehensive strategies to support communities at the local level and sustain cities' capacity for sustainable urban transformation in a broader sense (Urban Europe, 2020). The pandemic and its aftermath are prompting cities to rethink how they deliver services, how they plan their space, and how they can resume economic growth (OECD, 2021). In addition, it has revealed how community-based services - especially in the case of health care services and facilities - have affected the quality of life of local communities and vulnerable categories (OECD, 2021).

Schalock et al. (2002) identified eight core areas of quality of life: emotional well-being, physical well-being, material well-being, social inclusion, social relations, personal development, self-determination, and civil rights, which also influence the overall local community life (Kozma et al., 2009a; Mansell & Beadle-Brown, 2009). Community-based approaches foster a sense of responsibility and accountability among community members, ensuring that projects continue to benefit the community in the years to come. When local communities are actively involved in decision-making and implementation, they are more likely to ensure the long-term sustainability of projects. This reduces their dependence on external aid and allows them to take control of their development trajectory.

Resistance to change can be a hurdle in implementing community-based approaches. Some communities may be hesitant to adopt new ideas or approaches, especially if they have long-standing traditions or practices. Overcoming resistance and fostering community buy-in can require patience, dialogue, and a deep understanding of local cultures and customs. Improving the quality of life for local communities implies specific efforts to facilitate a more inclusive urban development. Therefore, equity, inclusiveness, urban accessibility, and sustainability can be considered the pillars for the paradigmatic shift towards resilience.

Community-based development for resilient and sustainable development hold great promise in addressing the pressing challenges of our time. It harnesses local knowledge and resources, enhance resilience, and ensure long-term sustainability. While challenges exist, the benefits of these approaches far outweigh the drawbacks. To create a more resilient and sustainable future, it is essential to continue promoting and expanding community-based development initiatives on a global scale. These approaches reflect a commitment to inclusive and equitable development, and they have the potential to transform communities and societies for the better.

1.2.1. From Deinstitutionalization to Community-Based Urban Development

Community-based development initiatives have their roots in the growing recognition of the importance of local communities in shaping their own destinies. Over the years, the limitations of centralized, top-down approaches to development have become evident, leading to a shift towards empowering communities to take charge of their own development. This shift was particularly pronounced in the context of deinstitutionalization, where the closure of large, impersonal institutions led to a reevaluation of how services and support could be provided to individuals in a more humane and community-oriented manner. This transformation marked the beginning of a broader movement towards community-based development, with a focus on creating resilient and sustainable urban environments that prioritize inclusivity, cooperation, and locally driven solutions.

The provision of social services primarily affects individuals and households (OECD, 2019). Their quality is critical to the life of citizens (Hughes et al., 2017). With the aim of delivering more tailored and effective public services, there has been a policy effort at the European and national levels to shift from institutionalized services to family-based and community-based alternatives following the deinstitutionalization approach (European Commission). Several international conventions provide the context for such a policy shift, including the 1948 Universal Declaration of Human Rights and, more recently, the 2006 UN Convention on the Rights of Persons with Disabilities and the more recent UN Sustainable Development Goals (SDGs) (United Nations). UN SDGs provide the context for national, regional, and local governments to advance a new

sustainable development paradigm. It provides a vision to engage local stakeholders, including the private sector and civil society, in co-creating and building the "resilient community". Despite the explicit goal of sustainable cities and communities (SDG 11) (United Nations), others can be included in promoting inclusiveness and reducing inequalities in cities from a community-based development perspective (Table 1).

Table 1. UN SDGs (United Nations) addressed by the topic under investigation.

SD Goal/s	Aim
3—Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
4—Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
10—Reduced inequalities	Reduce inequality within and among countries
11—Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient, and sustainable
16—Peace, justice, and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels

The deinstitutionalization concept is traditionally associated with mental health and intellectual disability (GIBSON et al., 2001). In the framework of deinstitutionalization, research has consistently demonstrated how this approach produces a better outcome for people than institutionalized care (Emerson & Hatton, 1994; GIBSON et al., 2001; Hatton et al., 2008; Kim et al., 2001; Kozma et al., 2009b; Mansell et al., 2007; Mansell & Beadle-Brown, 2009; Young et al., 1998). Deinstitutionalization was introduced in the 1950s to shift from institutional (as in a psychiatric hospital) to community care. Subsequently, the initiative was extended to other public services. In some countries, there was a shift from the initial focus on closing institutions and replacing them with smaller staffed houses in the community to more individualized options such as supported living, direct payment methods, and personal or individualized budgets (Mansell & Beadle-Brown, 2010). Some researchers have indicated that these individualized approaches bring additional benefits to people, especially in terms of choice and control (Hatton et al., 2008; Poll et al., 2006). The effects of the pandemic across territories have highlighted the importance of community-based alternatives in delivering services to vulnerable categories (OECD). This is especially true for healthcare services and facilities (OECD).

In the context of this work, deinstitutionalization is related to the shift of general public services from an institutionalized to a community-based perspective. This community-based vision characterizes the socially inclusive urban development for the contemporary city as it addresses socio-economic disparities (Deakin, 2009). Within this process, rooted in the deinstitutionalization approach, community-based organizations (CBOs) are important actors. CBOs provide different and valuable programs and services; they network and develop partnerships between organizations in urban contexts where it is necessary "to build coalitions, exchange/share resources, partner, and avoid service duplication," and provide services and support to the most vulnerable social categories (Wilson et al., 2012). Despite their relevant role in improving local socio-economic conditions, their adaptation to the mutated scenario for delivering these benefits in the future is coming to the fore (Bruce & Clarson, 2017).

transitioning from deinstitutionalization to community-based urban development is essential for providing more humane, effective, and inclusive care to individuals while contributing to socially inclusive and sustainable urban development. This approach places people at the centre, fosters autonomy, and encourages collaboration among community-based organizations, ultimately leading to more resilient and thriving urban communities.

1.2.2. The Italian Policy Approach: Providing the Ground for Community-Based Urban Development

The Italian policy approach for the organization and delivery of public services for vulnerable categories is rooted in the national law no. 328/2000 for the design and implementation of integrated social services and actions (Legge quadro per la realizzazione del sistema integrato di interventi e servizi sociali). The reform was introduced to overcome the fragmentation of the Italian social service system by addressing three key aspects: "the weak coordination among various institutional level, the huge difference existing between territories, and the vagueness and disparity of rights" (Bifulco & Centemeri, 2008) (p. 213). Following the reform, the public intervention in the design and management of social services was articulated in the involvement of different political-administrative levels: regions, provinces, and municipalities (Bifulco & Centemeri, 2008). The regional administration has the task of planning, coordinating social and health interventions and verifying their implementation, regulating the integration of the interventions themselves, and promoting collaboration with local authorities.

Municipalities have the task of designing and implementing Local Welfare Plans (Piani di Zona sociale), which can be designed and implemented by aggregating other municipalities (Bifulco & Centemeri, 2008). The Local Welfare Plan is a tool to organize and provide social services and interventions for local communities at the local level with specific objectives based on the analysis of the territorial context, the analysis of the qualitative and quantitative evolution of local communities' needs, the development of flexible management provision of services, the integration of public and private resources to avoid duplication and fragmentation, the definition of new opportunities and attraction of new resources, the definition of the services to deliver according to the responsibilities of the actors involved and the available resources also involving citizens (Regione Calabria). The regional administration defines the areas where such plans find their operationalization following the district rationale. In the case of big cities, such districts target one or more neighbourhoods. In the case of small and medium cities, these areas target more municipalities. These areas are determined based on criteria that can facilitate the deinstitutionalization of services following the community-based development perspective and usually group several municipalities. Such criteria are related to the geomorphological configuration, local community needs, the possibility to share resources and common territorial services, the transportation system's efficiency, accessibility of services, and previous co-design (Regione Campania).

Although this policy was introduced almost twenty years ago, some regions still encounter difficulties operationalizing it. For example, this is the case of Calabria, where such integration is not yet fully developed. The Calabria regional administration has designed the regional welfare plan according to the national law 328/2000. It has recently deployed preliminary measures to integrate welfare and urban planning tools (Regione Calabria) to better address public services.

As the Local Welfare Plan shows, the effective planning, organization, and administrative management of public services are essential for local administrations to respond to the local communities' needs (Regione Lombardia). Such effectiveness determines the quality of services, quality of life, and social, economic, and territorial cohesion. Then, two elements emerge. First, the organization of services for post-pandemic cities should follow the deinstitutionalization approach by promoting the community-based approach to facilitate accessibility. Second, within the current institutional and planning framework, the organization and planning of services require a territorial/spatial perspective shift from the municipal or inter-municipal level to the neighbourhood level. Data-driven approaches can help in this direction, providing interesting support in detecting socioeconomic development dynamics and capturing the evolving local communities' needs to address.

1.2.3. A community-based approach to marine resource management

A community-based approach to marine resource management has emerged as a promising approach to addressing challenges coastal communities face, such as, overfishing, pollution, and climate change, which threaten sustainability (Beyerl et al., 2016).

During the late 1960s and throughout the 1970s, the harvesting and trading of marine resources evolved into a more significant aspect of community life, even though it had already been part of people's livelihoods since World War II (Abernethy et al., 2014; Allan, 1957). The approach involves engaging local communities in the decision-making process and empowering them to manage marine resources in a sustainable way. Community-based management has been successful in a variety of contexts, from small-scale fisheries in the Pacific Islands to marine protected areas in the Caribbean (Johannes, 2002).

Community-based approaches to marine resource management are grounded in the principle of participatory management, which involves local communities in decision-making, implementation, and monitoring of conservation measures (Berkes, 2007; Brondizio & Tourneau, 2016). These approaches are based on the recognition that local people have valuable knowledge about their environments and that their participation in conservation efforts can lead to better outcomes (Gibson & Koontz, 1998). Involving local communities can promote social inclusion and create a sense of ownership and responsibility over the marine resources that sustain them. For example, in the Philippines, the Coastal Resource Management Project was designed to empower marginalized fishing communities to manage their own resources (Munoz, 1997). The project provided training and support to local people, including women, to establish community-based management systems. This project led to increased income for local people and improved social cohesion among community members.

Furthermore, one example of a successful community-based approach is the Vatu-i-Ra Conservation Park in Fiji (Smith et al., 2011). The park was established in 2010 through a partnership between the government, local communities, and NGOs. The park is managed by a committee composed of representatives from each of the six villages surrounding the park, and local people are involved in monitoring and enforcing regulations. The park has improved the health of the marine ecosystem and created new economic opportunities for local people through ecotourism.

The concept of community-based approaches, whether in the context of urban resilience or marine resource management, underscores the importance of local engagement, participatory decision-making, and inclusiveness. These approaches

have demonstrated their effectiveness in addressing various challenges, from climate change adaptation in cities to sustainable resource management in coastal communities. They emphasize the value of harnessing local knowledge and empowering communities to take ownership of their future.
Transitioning from vulnerability to resilience requires a paradigmatic shift in the way of thinking, where equity, inclusiveness, urban accessibility, and sustainability serve as the foundation for a more resilient and sustainable future. Next, regional challenges in resource and capability management is discussed, it becomes evident that these principles continue to play a pivotal role in addressing complex issues at both the local and regional levels.

1.3. Regional challenges in Resource and Capability Management

1.3.1. The lack of resilient approaches in managing resources and capabilities in certain regions

Managing resources and capabilities is crucial for sustainable development and the long-term well-being of societies (European Committee of the Regions . et al., 2022). However, some regions, particularly lagging or less developed areas, face significant challenges in implementing resilient approaches to resource and capability management. The rise in social, economic, and environmental vulnerabilities underscores the importance of incorporating resilience thinking into the development process (Eraydin & Taşan-Kok, 2013b).
Resilience refers to the capacity of a system to absorb disturbances, adapt to changing conditions, and maintain its essential functions and structures (Adger, 2000). In the context of resource and capability management, resilience involves the ability to effectively allocate, utilize, and protect resources and capabilities to withstand shocks and uncertainties (Folke, 2006).
Resilient approaches to resource and capability management encompass several key elements, including robustness, adaptability, and transformative capacity (Gunderson & Holling, 2002). Robustness entails building redundancy and diversity into resource systems to enhance their capacity to absorb shocks. Adaptability refers to the ability to adjust strategies and practices in response to changing conditions. Transformative capacity involves fostering innovation and learning to address systemic challenges and promote sustainable development (Liu et al., 2015). However, the limited adaptive capacity of less resilient regions can impede their ability to respond to emerging trends and technological advancements, hindering the pace of innovation and adaptation to new opportunities.
The absence of resilient approaches to resource and capability management has profound implications for the affected regions. These include increased vulnerability to natural disasters, social unrest, economic instability, and the perpetuation of poverty cycles. Furthermore, the lack of resilience can impede sustainable development efforts and hinder the achievement of global goals.
Several factors limit the innovative capacity of less developed areas (Rodríguez-Pose & Wilkie, 2019). Geographic isolation and socioeconomic shortcomings are among the most prominent. It is believed that these contextual deficiencies are related to the insufficient human and physical capital resources, insufficient local economic fabrics, as well as an absence of the formal and informal institutions which would normally function as a support system for an innovation-prone environment (Rodríguez-Pose, 2005).

Less developed regions often find themselves caught in a web of challenges. Resource limitations are a common stumbling block, with constrained funding and limited access to technical expertise hindering their capacity to invest in resilience-enhancing initiatives. Weak governance structures, marked by corruption and inefficiency, often undermine decision-making and implementation efforts, resulting in misallocated resources and ineffective strategies. Inadequate governance structures, weak institutions, and ineffective policies often hinder the development and implementation of resilient approaches to resource and capability management (Pelling & Manuel-Navarrete, 2011).

A critical issue lies in the lack of awareness and education regarding the significance of resilience, affecting both local residents and leaders who may not fully grasp the importance of resilience-building or the available strategies. The short-term focus on immediate economic or political gains can overshadow long-term resilience planning, leaving communities vulnerable to future shocks and stresses.

Furthermore, the heavy reliance on traditional, often vulnerable industries can impede efforts to diversify the economy, as concerns about job loss and economic disruption loom large. The digital divide looms as a significant barrier, as limited access to advanced technology and data hampers modern resilience planning and disaster preparedness. Social vulnerabilities, political instability, frequent leadership changes, inadequate infrastructure, and the limited capacity for data collection and analysis add to the complexity of the challenge.

Access to financing is another formidable hurdle, as securing funding for resilience projects is often elusive. Geographical vulnerabilities, especially in regions prone to natural disasters, can further discourage investments in resilience measures. Moreover, socioeconomic factors such as poverty, inequality, and limited access to education and healthcare, can undermine resilience in resource and capability management (World Bank, 2018).

Fragmented efforts among various stakeholders hinder the development and execution of comprehensive resilience plans, leading to suboptimal resource allocation and duplicated efforts. Recognizing and addressing these multifaceted factors is paramount to empowering lagging regions to develop effective strategies and build resilience to various shocks and stresses.

Marginalized communities often bear the brunt of resource degradation and are less equipped to adapt to shocks, perpetuating a cycle of vulnerability. Regions facing environmental pressures, such as climate change, deforestation, and water scarcity, are particularly vulnerable to disruptions in resource and capability management (Smit & Wandel, 2006). Inadequate responses to these challenges can lead to irreversible damage to ecosystems and exacerbate societal vulnerabilities.

Addressing these complex challenges in lagging regions requires a concerted effort involving governments, local communities, international organizations, and the private sector (Rodríguez-Pose & Ketterer, 2020). Recognizing these contributing factors is a crucial first step in crafting tailored strategies that empower lagging regions to build resilience and ensure a more sustainable and secure future.

Meerow et al. define urban resilience as "the ability of an urban system - and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales - to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to transform systems that limit current or future adaptive capacity" (Meerow et al., 2016). This definition shows that the ability of urban areas to adapt to change and transform systems aligns with the dynamics of socio-economic

development. The following section explores socioeconomic disparities in magnifying the challenges of urban development especially in lagging areas. The section examining the factors that contribute to both the advancement of socio-economic conditions and the existence of regional inequalities.

1.3.2. Socio-economic development and regional disparities

While implementing resilient strategies is crucial for fostering sustainable and equitable socio-economic development across different regions, it is important to acknowledge that disparities exist in the ability to adopt and execute these strategies. Addressing these disparities requires a holistic and context-specific approach. It involves recognizing the unique challenges each region faces and tailoring resilient strategies to their specific needs. Hence, understanding these disparities is crucial for developing nuanced and effective approaches to ensure that resilient strategies contribute to sustainable and equitable socio-economic development across diverse regions.

Socio-economic development signifies the ability to efficiently produce a sufficient supply of goods and services, accumulate capital, and distribute the benefits of production in a relatively fair manner (Mitrică et al., 2017). Disparities in wealth between rich and poor, developed and underdeveloped, or first and third World nations stem from variations in these socio-economic capabilities. While there is a broad consensus that socio-economic development involves production, accumulation, and distribution processes, the field of development studies has been significantly influenced by specific sociological concepts and economic metrics. Sociologists have underscored the shift from traditional to modern societies as a part of the broader social change process, while economists often define development primarily in terms of economic growth. These distinct perspectives have collectively shaped the contemporary understanding of socio-economic development (Jaffee, 1998).

Socio-economic development concept is analysed across various levels, including individual, organizational, societal, and international, offering a comprehensive framework for understanding the complex interplay of social, economic, and political forces (Jaffee, 1998). The spatial dimension of socio-economic development has gained prominence since 1990, with increased theoretical and empirical evaluations. This has given rise to the field of 'new economic geography,' which explores topics like economic geography perspectives, market structure, innovation, specialization patterns, and regional integration (Fujita et al., 2001).

Geographical literature has often tackled the intricate relationship between geography, the economy, and development, addressing issues such as competitive advantages of nations, globalization, inequality, territorial development, and the impact of geography on growth and economic policies (Gallup et al., 1999; Krugman & Venables, 1995; M. E. Porter, 2011; Storper, 1997). These discussions encompass the tension between centripetal and centrifugal forces in self-organizing (Krugman, 1999).

Socio-economic development plays a crucial role in understanding and guiding urban regeneration initiatives. It offers a framework for understanding and addressing the complex challenges associated with urban regeneration (Mitrică et al., 2017). It encompasses a range of frameworks that seek to explain and promote economic growth, social progress, and human well-being within urban contexts.

Connecting this with regional disparities, it is important to note that these disparities often intersect with and magnify the challenges of socio-economic development. Regional variations in resources, infrastructure, and opportunities can exacerbate disparities in wealth and well-being, highlighting the need for comprehensive

development strategies that address both socio-economic and regional imbalances. Addressing socio-economic development and regional disparities simultaneously is crucial because it ensures that economic progress benefits all regions, promotes social equity, and fosters a more balanced and inclusive society.

Regional disparities in socio-economic development are a persistent and multifaceted challenge faced by many countries worldwide. These disparities manifest in varying levels of income, employment opportunities, access to basic services, and quality of life across different regions. Understanding the causes and consequences of these disparities is crucial for formulating effective policies and interventions to promote equitable development.

The causes of regional disparities could be in infrastructure, human capital, governance, and economic policies. For instance, inadequate transportation infrastructure in southern Italy has hindered economic integration, limiting access to markets, employment opportunities, and public services (We Build Value Digital Magazine, 2019). Regional disparities can lead to unequal economic growth, with certain regions experiencing rapid development while others lag behind. Such disparities can widen income gaps, exacerbate poverty, and hinder overall national economic progress.

Italy has grappled with notable disparities between its regions. These disparities, characterized by varying levels of income, employment opportunities, access to basic services, and overall quality of life, underscore the urgent need for comprehensive policy approaches that address both socio-economic and regional imbalances.

Understanding the complex relationship between socio-economic development concept and regional disparities is essential for crafting effective policies and interventions tailored to the Italian context. It becomes evident that factors such as infrastructure development, industrial structure, employment opportunities, and governance play a substantial role in shaping regional disparities. Policy interventions aimed at improving infrastructure, enhancing education and workforce skills, and implementing institutional reforms can contribute significantly to mitigating these disparities and fostering more balanced socio-economic development across Italy.

Taking a closer look at the regional disparities within Italy, it becomes apparent that addressing these imbalances is not only an economic imperative but also a social and political one. Achieving greater cohesion between regions and promoting equitable development is vital for the long-term prosperity and social well-being of the entire nation. The next section delves deeper into the specific regional disparities that exist between different regions of Italy, highlighting the unique challenges and opportunities each region faces in the pursuit of socio-economic development.

1.3.3. Italian division

Over centuries, Italy's regional inequalities have been significant and persistent. Southern Italy has encountered a stagnant economy since the 20th century. This of course has negatively affected the Italian economy overall. For example, Italy's GDP per capita in 2020 is half that of Denmark's and about six-tenths of Germany's GDP per capita. By the beginning of the 21st century, lagging regions in Europe have been the focus of the EU and more policies developed to improve their well-being and reduce inequalities. Therefore, the control over policy areas like health and education was given to regional governments (Rolfo & Calabrese, 2006). This devolution, particularly in southern Italy – or the so-called Mezzogiorno, led to a sharp cut in the national budget to support industrial activities and even declining in health and education

services because of the corruption in the system (Leydesdorff, 2021). Moreover, state interventions privileged central and northern Italy – where more innovation and labour forces can be found (Prota & Viesti, 2013). On the other hand, the 2007–2009 financial crisis has severely impacted the Italian industrial system. The southern territories were disproportionately affected as between 2007 and 2012, industrial investment in the south declined by 47 percent (Prota & Viesti, 2013). The remaining investments were aimed to help increase productivity in southern territories but it was required higher institutional quality to function (Albanese et al., 2021). Therefore, weak institutions lie largely in the failure of regional policy toward the Mezzogiorno. Poor governance, manifested in political clientelism, turns regional development funds into instruments of patronage. Regional policy is captured by local and national elites and distorts incentives by encouraging rent-seeking rather than entrepreneurship (Felice, 2018). There is also a high crime rate which exacerbates Mezzogiorno issues more (Leonardi, 1995). As a result, despite significant regional development expenditure, the south continues to suffer from relatively poor connectivity and low quality of education.

This section pays attention to the reasons behind the uneven development in Italy. First, it identifies the trajectories of both regions and compiles the public criticism of the national disparities between northern and southern Italy (see figure 2 for Italy's regions' map). Then, analysing the inherited reasons behind these disparities by investigating this underdevelopment region's historical and institutional legacy. This legacy has a specific role in today's regional development. The evolution of the nation's policies and their frameworks were studies to trace the changes in regulations over time and to investigate the historical political-economic inequalities that strongly influence Mezzogiorno's economic performance and foster its instability. The investigation was based on three critical turning periods in Italy; I) 1950-1992: national regional policy (Cassa per il Mezzogiorno and Intervento Straordinario), II) 1992-2008: EU Cohesion policy and local development strategies, and III) the Great Recession and its aftermath. For each period, there is a focus on the development trajectories, their paradigms and discourses, political context and policies deployed, and social changes.

Fig. 2. Italy's Regional Landscape: A Dichotomy in Colours

Northern vs Southern Italy; understanding the lagging growth of Southern Italian territories

The disparities and underdevelopment of southern territories have accumulated through a range of historical events that took place in different eras. These events are rooted back in the Roman Empire. It is essential to know how these disparities are constructed discursively by different groups at different times. The historical events prior to the 20th century are briefly discussed. After these events are grasped, a detailed analysis will be conducted over the course of the mid-20th century to the early 21st century. Subsequently, special attention will be paid to the aftermath of the Great Recession. In the end, the recurring problem plaguing southern Italy is analysed. This builds into the final part that will discuss some suggestions to find mechanisms that try to help to reduce Italy's regional inequalities.

The regional disparities across Italy

Overall, Italy is known for its innovative manufacturing and services and the so-called "industrial districts" (Bertamino et al., 2017). These industrial districts are mostly located in the northern regions and are characterized by their highly innovative technologies (Biggiero, 1998). However, Italy is the only country in Europe with the most substantial and persistent territorial inequalities with an extraordinary degree of geographical concentration; among 173 European regions, the five poorest are in southern Italy (Rosés & Wolf, 2018). The disparity in Italy is huge; Lombardy region has the highest regional GDP - roughly 400 billion euros – which accounts for more than one-fifth of the Italian GDP, while all eight Southern regions as whole produce less than Lombardy (Statista, 2021b). In OECD report for 2018 on Italy's regions and cities, it stated that "Italy has the largest regional disparities among OECD countries in unemployment rates, and the second largest in terms of safety" (OECD, 2018). In 2020, the six regions with the lowest unemployment rate were in southern Italy, with nearly 50 percent of Calabria's population unemployed (Statista, 2020). Mezzogiorno unemployment exceeds 20 percent, and it only attracts 1 percent of Italy's inward foreign direct investment (FDI). Consequently, large emigration from the south, particularly the young and skilled, continues. Poverty rates are twice as high in the south than in the north. This is hampered by poor institutional quality, as well as labour market rigidities (Boeri et al., 2021).

Many studies have been conducted on Italy's north-south divide – or what is called "the Southern question", and they have focused on incentives, geographical problems, weak land property institutions, rent-seeking informal institutions, and corruptive economic policies (for an overview, see Martinelli, 2013).

Additionally, this north-south divide could even lead to fractures within the south itself (Asso, 2020). Quantitative studies in this respect show that despite the same picture of backwardness of Mezzogiorno, there is high internal variability within the region (Asso, 2020; Nifo & Vecchione, 2014). The southern provinces are not similarly lagging behind the rest of the country, but they are a heterogeneous bloc (Asso, 2020). Moreover, the study shows that one of the major weaknesses in southern Italy is firms. Although there are high-performing firms within the region, the number of firms is not only a few, but firms in the south are more dispersed and isolated. The Recession caused a significant contraction in the production base in most of the southern regions, with a larger decline in the number of firms. For example, in Campania, Puglia, and Sicily, the number of firms operating fell almost every year between 2007 and 2017, and the survival rate of

new firms five years after their founding was systematically less than 50 percent. One of the other results of that study is that "the quality of institutions does matter.... Growth seems to be strongly associated with institutional quality – most significantly with the efficiency of local government, education and the capacity to enhance cooperation".

Therefore, both economic and socio-institutional factors can explain the depressing growth prospects and increasing inequalities within the region. Unfortunately, Mezzogiorno experiences backwardness in all of these aspects as was mentioned earlier. Regional economic disparities within Italy will not be narrowed simply by building infrastructure or increasing productive investment in the south. However, governments need also to address the educational system and tackle organized crime. The following sections are a historical background of the disparities embedded in the nation-state of Italy in order to understand how history illustrates current regional inequality.

The "CASSA PER IL MEZZOGIORNO" and INTERVENTO STRAORDINARIO

The World Wars and Great Depression put pressure on the nation's economic, political, and social situation. Through the course of the early half of 20th century, Italy witnessed different turning points, such as fascism and globalization. However, in the mid-20th century, Italy was the fifth-largest industrialized economy globally (Martinelli, 2013). The nation's economic strategies were framed and directed towards three goals: growth, modernization, and industrialization. The nation's industry was based on mass production to foster exports to the prosperous northern European countries (Martinelli, 2013). Towards the beginning of the 1950s, the issue of regional disparities within advanced economies gained prominence, and many European countries started forming regional programs. At that time, it was emphasized the need to intervene in the Mezzogiorno to break the feudal model and create a working-class consciousness. Therefore, Cassa per il Mezzogiorno (Fund for the South) was created to manage the program under government control but with an independent budget and the power to design, finance and implement investment programs and projects (Felice & Lepore, 2017). At that time, the regional policies transformed the Mezzogiorno economy and its social structure. It was established to form a ten-year program of public works and for partial agrarian reform. The public works program was established to maintain employment and income while attracting private investment. Subsequently, a new class of small and politically moderate landowners and a modern working class were created. This was the period when Mezzogiorno – for the first – was fully integrated into the national development paradigm and, therefore, the gap with the rest of the country was narrowed. The results of this temporary integration are impressive: the socio-economic structure of the Mezzogiorno evolved from dramatic poverty and pre-industrial relations to a modern, relatively affluent, partially industrialized capitalist society. By the end of the 1950s, the Cassa per il Mezzogiorno was reauthorized, refinanced, and extended to the 1970s. The new strategy aimed to provide incentives for firms in the south, obligate the state institutions to place a quota of their procurements and investment in the south, and develop new industries with more infrastructural investment. In the 1960s, the north industrial growth was fully developed, and the system started to expand. Steel and petrochemical companies constitute most of the southern industrialization during this decade. By the early 1970s, these industries were joined by some northern private companies. It was a time when regional policies made a difference.

The period 1960–73 was the golden age of Mezzogiorno. It moved from an average of 16 percent of national industrial investment during the 1950s to 37 percent in 1972 (Del Monte & Giannola, 1978). These investments targeted heavy industries and, later, modern sectors (Martinelli, 1985). This, of course, helped in creating job opportunities. However, the economic crisis of the mid-1970s severely affected these industries. Moreover, it led to a crisis of small firms, which were wiped out by their more competitive northern industries. During the late 1960s, this crisis caused the so-called "Hot Autumn" in 1969. This was a wave of strikes by workers for social reforms, democracy, and civil rights. Additionally, in ten years – from 1951 to 1961 – 12 percent of the southern population emigrated first abroad and later towards the Industrial Triangle in the north. The issues, however, were not perceived, and Cassa per il Mezzogiorno continued along the old lines throughout the 1970s. The only change was the establishment of regional governments in decisions regarding infrastructure investment. In Italy, the 1980s was a decade of deterioration in the state, moving from development to nepotism.

On the other hand, there was a move from manufacturing to services in most Western countries and technological change in that decade. Thus, small and medium enterprises (SMEs) started to "sprout", and the local development model has gained prominence. These shifts contributed to a (re)focus on the southern question in scholarly research, political circles and the media. Therefore, an intervention was necessary to create an intermediate step between stagnation and modern industry "Intervento straordinario nel Mezzogiorno" (Servidio, 2014). Intervento Straordinario (Extraordinary Intervention) was the last nation's attempt to develop, however, the nation witnessed new conflicting interests and public spending was increasingly used to gain consensus. Therefore, Intervento Straordinario, unfortunately, became a waste of public money, a hindrance to Mezzogiorno's subjective potential and a means of clientelism. This decade witnessed the falling of national regional politics. The Cassa was abolished in August 1984. Since 1986, a European cohesion policy has been formulated to intervene in the investment of southern Italy.

The era of European integration and EU cohesion policy

The early 1990s was a turning point for all of Europe. At the international level, the union of the European countries in the Maastricht Treaty, 1992, started forming national government power, especially in regional policy. At the national level and in the same year, Italy witnessed a new economic crisis and the collapse of the Italian lira along with an unprecedented simultaneous political crisis that led to the dissolution of two major political parties (Christian Democracy and the Italian Communist Party). In the early 1990s, a nationwide investigation was launched in Milan to uncover the corruption system over the whole national territory. This caused political changes and, with the 1994 elections, started the so-called "Second Republic". In 1992 the intervention actions in Mezzogiorno were replaced by ordinary investment procedures and European policy for lagging regions. This period of the 1990s witnessed a new discourse revolving around local development, places and competitiveness, and the bottom-up planning approach based on collaborative and integrated policies (Martinelli, 2013). From 1992 to 2001, the governments of Italy aimed to meet Maastricht's requirements to join the European Monetary Union by 1998 and be part of the EU single market.

Launching the EU cohesion policy allowed Italy to abdicate its developmental responsibility towards the Mezzogiorno, and the word 'Mezzogiorno' gradually

disappeared from official documents and was replaced by the EU term "lagging regions". There were some territorial programs to foster local social capital, institutional capabilities and governance, but the amount of funding available to such initiatives was risible and had mixed results (Magnatti et al., 2005; Martinelli, 2013). Cohesion policy is the European Union's strategy to address the uneven economic growth across the EU by promoting balance between its territories and regions. Italy is one of the biggest beneficiaries of the Cohesion policy fund (Groen et al., 2021). The policy fund drives large investments in southern Italy. Cohesion Policy results in overtime show high impact on GDP per capita in Italy. However, the impact on territorial convergence is less optimistic. The reason for that could be that southern Italy suffers from poor economic conditions to which it adds its own internal structural difficulties that cannot be compensated only by policies of cohesion (Petraglia & Provenzano, 2018).

From 1992 to 1998, public spending in Mezzogiorno nearly crippled (Martinelli, 2013). Martinelli, pointed out that "the first two rounds of EU cohesion policy for Objective 1 regions (1989–93 and 1994–99) registered enormous delays, forcing the Italian government to ask for repeated extensions." The situation started to improve only by the beginning of the 2000s. It was with the resumption of national concern in regional policies and the launch of the 2000-2006 round of cohesion policy that involved the launch of the European Strategy for growth and jobs. The policy had a significant improvement in the programming and spending capabilities of Southern regional and local governments. However, the goals were too ambitious to achieve and the programs lacked a strategic and integrated approach (European Commission, 2010).

On the other hand, in the 1990s, SMEs played a vital role in the north-central regions, and it is argued that hosting SMEs in southern cities could be a possible way for its development[1]. However, it was not sufficient to redress the stalling of the regional economy. The 1990s saw the establishment of an unstable national strategy and the gap between the Mezzogiorno and the rest of the country widened again, and unemployment soared.

The situation in southern Italy could have been worse without the cohesion policy, but the point is, cohesion policy was just the replacement of public expenditures in the Mezzogiorno, and it did not add much difference. The European Commission shows that the performance of the southern regions was the lowest among Objective 1 regions, with barely a 1 per cent annual growth rate (European Commission, 2010). Only in a few cases where some innovative and negotiated programming practices had implemented. These cases were either rural areas less threatened by clientelistic relationships or urban areas where mayors' elections had a role in breaking the path (Martinelli, 2013).

The EU tried to expand its policies to the Eastern part of Europe. This led to a change in the fund's distribution and attracted investments away from southern Europe. It happened alongside the 2008 financial crisis and its perpetual regional negative effects. The next section briefly illustrates how the 2008 economic crisis affected the already large divide inherited by a long history of unbalanced growth at the regional level.

The great recession and its aftermath (2008-present)

The EU's regional development policies have led to a decrease in social and economic inequalities between more and less developed countries in the EU, while the gap

[1] https://www.confcommercio.it/-/mezzogiorno

between regions has widened, especially since 2008. The global financial crisis of 2008 worsened the performance of the more developed regions, and it significantly halted the upward trend of the less developed regions.

Regardless of the consequences southern cities had suffered in the previous decades, this time the south was more seriously hit. Asso claims that Mezzogiorno is still far from recovering its pre-crisis level (Asso, 2020). The income per capita gap between northern and southern regions reached the highest since WW2. Moreover, the unemployment gap increased 25 percent after the Great Recession (Antonin et al., 2019). In 2018, GDP per capita in the southern and center-northern regions were at 55.2 per cent and 76.7 per cent, respectively, and the unemployment rate was nearly double the national average (SVIMEZ, 2019).

The roots of these disparities are both recent and embedded in the country's history. However, these disparities have been increasing despite all attempts to curb them. Following the 2008 financial crisis, national governments responded to such a crisis with a challenging program of fiscal consolidation – tax increases and expenditure cuts – that led to a more intense economic downturn (Prota & Grisorio, 2018). Fina et al. pointed out that the cumulative effect of the fiscal measures adopted during the crisis exceeded 120 billion euros, nearly 8 percent of GDP, and was especially concentrated in the period between 2011 and 2012 (Fina et al., 2021).

Another new alarm that, if happens, will increase the gap with the South even more. Three Northern regions – Veneto, Lombardy, and Emilia-Romagna – requested differentiated autonomy (Ferraretto, 2019). Lombardy and Veneto already held a referendum in 2017, confirming this demand by citizens, anticipating negotiations with the central government. Emilia-Romagna, however, committed directly to the governor of the region to begin negotiations with the state in the same year. After these requests, seven other regions began the same procedure (Piedmont, Liguria, Tuscany, Marche, Umbria, Lazio and Campania), but no agreement has been found so far (Fina et al., 2021). The stability of the entire country could be jeopardized if this were to happen because the demand for greater autonomy by the richest regions might turn into populist demands for the full retention of locally owned resources. Most recently, the COVID-19 global pandemic has further increased uncertainty around future trajectories and has already widened the gap between northern and southern Italy.

The northern regions of Italy are the main drivers of Italy's economic development. They also benefit from the proximity to countries like Switzerland and France, which ease creating attractive business opportunities for a highly qualified and educated workforce. However, this results in higher costs of living and substantial government investment in infrastructure, which gentrify the areas and thus, low-income families face increased risks of social exclusion. Central Italy has relatively moderate conditions. It is characterized by average living standards and average conditions for economic development. Its income opportunities and infrastructure provision are below the national average. Finally, southern Italian regions are of course lagging behind the national average.

Economic and social conditions in southern regions have been very fragile. The reasons for that are embedded in the lack of investments and the loss of population because of brain drain, foreign migration, and ageing. The rising income inequality issue has been at the heart of the policy agendas of major international bodies.

The issues stated above have haunted Italy over many centuries, especially in regard to its industrial and societal sectors. The literature shows that northern areas were getting more attention from investors and prospering more than similar territories in the south.

During the first half of the 20th century, northern cities took possession of almost 90 percent of all national capitals invested in industries (Asso, 2020). Many solutions have been sought and implemented over centuries to narrow the northern-southern gap.

One might argue that policy failures over the decades stem from the limited resources allocated to improving public goods in the south which was more geared towards increasing its competitiveness. In addition, investments, whether public or private, have tended to favour more prosperous areas. Unfortunately, there were calls on concepts like "territories with no future" and "places that do not matter". Nonetheless, no one could say that these regions have no future. Through this research, it is believed Mezzogiorno needs a place-based and multidisciplinary approach to fix the underdevelopment and poverty embedded in the region. The approach should require not only economic and political perspectives but also geographic and social factors. This could happen by having a regional development policy but differ from the ones that were proposed over the last century. In the past, regional development policies were working on large scales and focused on attracting inward investments. However, besides having a regional development policy for Mezzogiorno in order to push the whole region to a more inclusive transition, smaller-scale strategies should be branched from it. Each urban area needs to have its place-based approach. It is vital to focus on territories specific assets and emphasis on opportunities rather than disadvantages and need for support. The regional plan should focus on better infrastructure, more industry, higher employment, higher income, elimination of corruption, and proper education.

The geographical impediment has been one of the main barriers to Mezzogiorno development over centuries and there is a need for improved infrastructure that connects region's cities together and connects them to the rest of the country (Chenery, 1962). Additionally, Mezzogiorno lacks major industrial sectors which contributes to the high unemployment rate. However, having good industrial sectors in the south would need the improvement of infrastructure first—for example, more efficient logistics and transport management. In order to help firms to flourish, there should be a robust industrial policy to help new businesses specialize in the right sector and develop cooperative behaviour to reduce isolation and have strong networks. On the other hand, the organized crimes in Italy and, in particular, in the south is behind the corruption and the failure of the structural funds. The basic need for that is the enforcement of police agencies and court systems. With all these mentioned parts of intervention comes education. As pointed out earlier, education is one of the lagging sectors in southern Italy and many undergrads fly to the north for a better system. Moreover, the emergence of better jobs with better income in the other parts of the county leaves Mezzogiorno vacant. Probably well-educated generation will be breaking down the inherited and embedded disparities in the nation.

In this respect, policies oriented to the southern underdevelopment should aim to overcome the inertia of an undesired business as usual development. It is important that the Cohesion Policy 2021-2027 is funded with an adequate budget for southern regions to implement improvements in infrastructure, boost industrialization, eliminate corruption, reinforce health services, and reinstall proper education all at the same time. In the last few decades, especially with the policy of cohesion, there has been a shift from a focus on regional equity to enhancing regional competitiveness and the contribution of regional economic growth to national performance (Fina et al., 2021). However, Italy needs a perspective that focuses more on the idea that regional disparities matter for reasons of equity and social and political cohesion, more than just

for efficiency reasons. A place-based approach is essential in order to focus on providing Southern people with opportunities and highlight the unutilized potentials. The policies should be oriented toward public investments; especially for education and health, support employment; also, through hiring in the public sector, and decentralize governance.

On the other hand, scientific studies conducted on Italy's regional divergences need to add another type of analysis. Within-regions studies could reveal the nature and causes of local development. It can help underpin the hidden potentialities and unexploited opportunities (Asso, 2020). Over decades, the Italian authorities tried to introduce industrialization policies, however, for example, southern Italy has a plethora of historic cities and towns as well as some of the most beautiful beaches that could be perceived as a means of revitalizing the southern Italian economy. Nevertheless, southern cities experienced a haphazard development in tourism. In other words, despite the isolated successes, the tourism industry as a whole lacks a coherent policy. With improved transit access and investment in infrastructure, Southern Italy has great tourism potential. But yet these are vulnerable sectors, and risks (such as climate change and pandemics) will likely put or are already putting additional pressures on these sectors. This has to be considered for the long-term development and for the need to build a strong, more sustainable and resilient tourism economy.

Additionally, southern Italy has an agricultural-natural value; it is known for producing fruits, vegetables, olive oil, wine, and durum wheat. The focus on agriculture can be through maintaining the natural and rural landscape, improving market access, providing more incentives to local farmers, easing regulations, and enhancing governance. Again, the solution goes back to improving infrastructure such as roads and reducing shipping costs.

In a nutshell, the orientation in Mezzogiorno should be towards place-based strategies that focus on what southern cities actually need and what are their resources that could utilized. The region needs the introduction of policies tailored to the specific needs of Southern people and places. Tourism and agriculture seem to have the potential to revitalize Southern cities. Furthermore, there is a need to go back to focusing on territorial equity rather than regional competitiveness. More public investment is needed – but not only in public works and manufacturing but more in education and health. Better public services trigger economic activity and stimulate long-term economic growth. Additionally, offer job opportunities, especially among young people to counterbalance the sharp downturn in the south. Besides that, new multi-level governance is necessary to reconsider the prominent role of the central government.

The South's socio-economic and socio-ecologic aspects

Italy's economy has a much slower productivity trend than the rest of Europe, which contributes to its difficulty in keeping up with other advanced European countries and correcting its social and environmental imbalances. According to OECD's five dimensions of fragility (Economic, Environmental, Political, Security, and Societal) (OECD, 2016b), Italy is considered a fragile country from an economic, social, and environmental point of view. Since the late 1990s, Italy has seen its economy stagnate - not only because of trade shocks, bad government, labour market disturbances, or a lack of technological advances but also because it is the country's management style that is holding it back (Maryland Smith, 2021). During the period from 1999 to 2019, Italy's GDP increased by 7.9 percent. While Germany, France, and Spain, the increases were 30.2, 32.4, and 43.6 percent, respectively (Italia Domani, 2020). In the 14 years

between 2005 and 2019, the number of people below the absolute poverty line increased from 3.3 percent to 7.7 percent of the population before increasing again in 2020 to 9.4 percent. The rate of young people (15-29) not in education, employment, or training (NEET) in Italy is the highest in the EU. Southern regions are facing even greater problems, where convergence with the richest areas of the country has stalled. A major cause of the disappointing productivity trend is the inability of companies to take advantage of the opportunities provided by the digital revolution (Pellegrino & Zingales, 2017). Moreover, among the reasons for the delay is a lack of adequate infrastructure as well as small and medium-sized enterprises, which are often slow to adopt new technologies and move toward higher-value products.

Public sector workers are also unfamiliar with digital technologies. In Italy, 98.9 percent of public administration employees had never used smart working before the pandemic (Italia Domani, 2020). In spite of the pandemic, when public services could use this way of working to the tune of about 53%, the effective use was only 30%, with lower levels in the south by about ten percent. These delays in modernizing the public administration, infrastructure, and production chains are partially due to the decline in public and private investments. The familism and cronyism of Italy can also deter economic growth, even in a highly industrialized nation (Pellegrino & Zingales, 2017).

Bruno Pellegrino and Luigi Zingales, finance professors at the University of Chicago, studied Italy's productivity problem and found that tech-intensive sectors had higher productivity growth in countries where merit-based hiring, promotion, and rewards were more common (Pellegrino & Zingales, 2017). According to their meritocracy score, Italy ranked last. They claimed that Italian firms are often accused of using cronyism and nepotism to determine who gets ahead.

The south has even worse circumstances. As recommended by the European Commission, the southern production system must be strengthened structurally. Although a third of the Italian population lives in the south, only a quarter of the country's gross national product is produced there. As of today, it is the largest and most populous backward territory in the eurozone. It is not just an Italian issue, it is a European issue that transcends national boundaries and requires a coordinated effort and cooperation at the EU level to address and find effective solutions. Not only the GDP per capita is lower in the south than in the centre and north, but also the south has lower productivity, quality and quantity of human capital, infrastructures, and public services, as shown in the section above.

Calabria

In general, Calabrian urban areas share the same challenges/threats affecting the sustainability of the European urban system. 1. Demographic decline (aging of the population, reduction in population, and intense suburbanization), 2. Exclusion of a greater proportion of the urban population from the labour market, forcing them to rely on low-skilled, low-paying service sector jobs, 3. Increased income inequality and progressive impoverishment of a large portion of the population, 4. An increase in social and territorial segregation, 5. Increasing numbers of marginalized people, 6. A rise in the number of low-density settlements leads to higher costs and difficulties in guaranteeing public services, as well as an increase in flood and water shortage risks, 7. Intensive exploitation of natural resources, and 8. Inadequate or insufficient public transportation networks.

Within southern Italy, Calabria has the worst socio-economic figures. In 2019, the GDP per capita was 17.3 thousand euros, about half of the average for central and northern

regions. Furthermore, the GDP has been decreasing since 2011 (Istat, 2018a). The employment rate was 39.6% in 2017, while the national employment rate at that time was 56.9% (Svimez, 2017). A low level of economic development and a high unemployment rate result in low levels of wealth among residents, and poverty is relatively widespread (Istat, 2018a). 2017 saw a relative poverty rate of about 35% in Calabria, compared with 12% in Italy and 25% in the south (Istat, 2018b). Regarding demographic growth, it was negative between 2013 and 2018 (from -0.2% to -0.5%) (*Popolazione Calabria (2001-2021) Grafici su dati ISTAT*). Moreover, the percentage of manufacturing employees in Calabria has historically been extremely low (Cannari & Franco, 2011). A low level of internationalisation and innovation characterizes the Calabrian productive system, and Calabria accounts for an extremely small share of total Italian exports-about 0.1% (Svimez, 2017).

Over the past years, a pandemic crisis has profoundly impacted the economic and institutional structures of Italian society, exposing the need for structural reforms. This context requires an analysis of the paradigms and methods to identify priorities and projects that will be useful for the economic and social reforms. In order for Italy to fight poverty, social exclusion, and inequalities, it must improve its public administration, strengthen its production system, and step-up efforts to tackle inequalities. Next Generation EU represents an unmissable opportunity for the Italian's development, investment, and reform. Italy proposes a National Recovery and Resilience Plan (PNRR, Italian acronyms) which consistent with the six pillars of the NGEU and largely satisfies the parameters set by the European regulations under green and digital transition. The PNRR, formulated by numerous constitutional bodies, represents an important step in ensuring the effectiveness of an effective way out of the crisis.

Undoubtedly, overcoming inequality in the regions is one of the main missions of PNRR. If a well-designed plan is put into practice, it has the potential to succeed. With this Plan, there is enormous potential for the country, and it also represents an opportunity for areas that are struggling to grow to catch up with the rest of the nation. To accomplish this, funds alone are not enough, but a perfect decision-making mechanism is necessary to balance territorial and national responsibilities.

There may be hurdles not only in utilizing the available resources but also in involving regions and local authorities (Provvisiero, 2022). It is possible to make the implementation of the plan ineffective if the regions are not sufficiently involved in its governance (Provvisiero, 2022). According to Regulation (Eu) 2021/241 of the European Parliament and of The Council of 12 February 2021, "regional and local authorities can be important partners in the implementation of reforms and investments. In that regard, they should be appropriately consulted and involved, in accordance with the national legal framework" (Official Journal of the European Union, 2021).

In general, any intervention involves four main phases during which the various levels have different responsibilities: developing the plan, proposing projects, implementing, and monitoring and verifying. During each of these four phases, regions undoubtedly play a crucial role, especially during the phases of identifying objectives and implementing selected projects (Trapani, 2021). Italy is called upon to respond positively to the "Southern question" and thereby close this huge gap by giving special consideration to the planning of the southern regions.

Taking on the challenge of a historic node in the country's development is the primary responsibility of PNRR. Many young and qualified people emigrate to the richest areas of the country and abroad due to scarce job opportunities in the south. As a result, the

human capital in the south is further impoverished and its potential for autonomous development is reduced.
The PNRR provides a window of opportunity for the south to relaunch and for the convergence process to resume. This plan, combined with the structural funds programming for 2021-2027 and the REACT-EU programme, gives the south a remarkable capacity to spend and invest money, aligned with the Next Generation EU guidelines, in order to rebalance the territory and revitalize its development. In contrast to the 34 percent set by law for ordinary investments destined throughout the national territory, the Government has decided to invest at least 40 percent of the territorializable resources of the PNRR in the eight regions of the south.
In line with the specific recommendations of the European Commission for Italy and the digital objectives of the Union, the interventions of Mission 1 in PNRR help increase the productivity of SMEs in the south and improve connectivity in rural and inland areas. Mission 2 contributes to overcoming territorial gaps. Specifically, the recommendations of the European Commission for Italy encourage investment in waste management infrastructure and water infrastructure in the south. With the plan implemented, the administrative capacity of the southern regions will be strengthened, allowing for better utilization of resources. In Mission 3 for the quality of the infrastructure, investments strengthen the infrastructures of the Mezzogiorno are at the heart of the mission, in particular the high-speed rail, which also helps to improve employment throughout the chain logistics.
In Mission 4, the projects that fight against educational and innovative poverty have a strong impact in the south, paving a path that will lead to the respect of the essential levels of services to be guaranteed to all citizens wherever they reside. A key objective of Mission 5 is strengthening essential services and addressing the connectivity gap. Digitization will help improve job opportunities, and social and health services, and build opportunities for future generations in territories at risk of depopulation. And lastly, by reforming and investing in health systems based on care needs, Mission 6 helps overcome the gaps between regional health systems.
A large BE investment of up to $3.1 billion is included in Italy's PNRR through 2026 to modernize port infrastructures (Calabria, 2022). Digitalization will also receive funding in order to improve ecological sustainability, efficiency, and security at ports. Additionally, a number of maritime-related investments are proposed, including greening and modernizing fisheries and aquaculture, monitoring marine and coastal biodiversity, restoring river systems, wastewater treatment, flood protection, offshore energy parks, coastal tourism, and investments in green shipping and blue skills. In that sense, PNRR represents a great opportunity for the BE in the country to flourish. Disparities in the country, however, make it difficult for some regions to manage their natural resources and use them to their advantage.

1.4. Legal Framework for Sustainable Territorial Development in Calabria: A Comprehensive Analysis of Urban Planning Law[2]

This section serves as a bridge between the broader exploration of resilience, regional challenges, and socio-economic disparities and the specific context of urban planning laws in Calabria. It allows for a focused discussion on how legal frameworks influence the community-based approaches discussed earlier in the chapter, emphasizing the role of legislation in shaping urban and coastal development strategies.

[2] https://www.regione.calabria.it/website/portalmedia/2019-01/legge-19-del-2002.pdf

Calabria has established a comprehensive legal framework for regional planning, emphasizing sustainable development, inter-entity cooperation, transparency, and citizen engagement. This legislation is a pivotal tool for fostering responsible and inclusive development in the region, outlining overarching principles and goals with a focus on effective and sustainable territorial development. The law addresses planning, protection, and recuperation of the regional territory, aiming to ensure both the physical and cultural integrity of Calabria while improving the quality of life for its residents. It advocates prudent utilization of environmental, natural, territorial, and historical-cultural resources, including specific provisions for landscape planning.

The legislation promotes cooperation among various administrative levels, including the Region, Provinces, Municipalities, and mountain communities. It underscores the importance of collaboration among economic, social, cultural, and professional forces in the formation of planning tools. Administrative processes are designed to be simplified, ensuring transparent decision-making. Active citizen participation is encouraged, allowing the public to contribute to decisions impacting development and environmental resource usage.

In terms of implementation, the law aligns with the principles of participation and subsidiarity in the legal systems of both the Republic and the European Union. The Calabria Region is responsible for establishing an efficient system of territorial programming and planning. Each administration overseeing territorial and urban planning must appoint a coordinator to facilitate public awareness and participation.

Provisions within the legislation outline participation procedures, ensuring consultation with economic, social, and professional entities. The development and approval of territorial and urban planning instruments prioritize adequate publicity and coordination. The involvement of interested parties in decision-making processes is actively supported. The legislation also mandates publication requirements, obliging municipalities to make urban planning instruments, public initiatives, and administrative acts related to territory management accessible to the public. Acts of popular participation and documents from citizens or groups must also be made publicly available, with non-compliance risking the ineffectiveness of these acts. The general principles of territorial and urban planning underscore the need for a clear and motivated articulation of determinations derived from a systematic understanding of the physical, morphological, and environmental characteristics of the territory. This involves considering various factors such as resources, territorial values, archaeological constraints, existing land use, ongoing planning, demographic trends, migratory patterns, and socio-economic dynamics. The decision-making process involves comparing values and interests, guided by the overarching principle of environmental sustainability in development.

The general objectives of territorial and urban planning, as outlined in official documents, encompass several key aspects. There is a focus on promoting organized development of the territory and urban fabrics, encouraging continuity over isolation and dispersion. This approach aims to achieve territorial savings and avoid the need for primary urbanization works by public entities to serve scattered nuclei. Another critical objective is preserving the essential material characteristics of the territory, safeguarding it from irreversible alterations while maintaining cultural attributes. The planning also seeks to enhance the quality of life and healthiness of urban settlements, reduce the impact on natural and environmental systems, and promote the preservation of environmental, architectural, cultural, and social qualities.

The importance of using new territory only when no alternatives exist is emphasized, with the aim of preventing isolated or scattered nuclei on the territory while meeting urban planning standards. A notable addition to the objectives is the promotion of plans and programs for "Urban Regeneration," aiming to requalify significant parts of cities and urban systems, fostering territorial savings and creating a more cohesive urban fabric. The emphasis is on addressing unattractive urban areas within existing perimeters to meet housing needs and possibly achieve economies of scale. The Regional Council, with the proposal of the Regional Minister for Territorial and Urban Planning, approves an operational guidance document to define the implementation modalities of these "Urban Regeneration" plans and programs, which territorial entities can adhere to.

Moreover, there are systems integrad to territorial and urban planning in the Calabria region, highlighting the naturalistic-environmental, settlement, and relational systems as key components. The naturalistic-environmental system covers the entire regional territory, interacting with settlements in processes of transformation, conservation, and territorial requalification. The settlement system encompasses various types of settlements, including urban, peri-urban, and dispersed areas, categorizing them based on their functions. The relational system involves networks such as infrastructure, energy distribution, communication, ports, airports, and intermodal exchange centers. The Region holds the responsibility for defining these systems, and the Regional Territorial Framework (Q.T.R.) serves as the tool for accomplishing this task. Within each system, the Q.T.R. identifies key elements. For the naturalistic-environmental system, it includes units like geomorphological and landscape environmental units, areas of environmental conflict, continuity, civic and collective silvo-environmental areas, areas of value, risk, conflict, and abandonment/degradation. In the settlement system, it distinguishes between urban and peri-urban areas, specifying elements such as urbanized soils, non-urbanized soils, and soils reserved for urban infrastructure. The relational system identifies reserved elements for urban infrastructure, encompassing road systems, railway systems, port and airport systems, intermodal exchange centers, energy distribution networks, and telecommunication networks.

An important consideration is the interconnectedness of these systems with neighboring regions, emphasizing the need to view them in the context of potential relational continuity with adjacent territories.

The law emphasized the planning tools and contents in the Calabria region, focusing on multiple levels—regional, provincial, municipal, and territorial.

Quadro Territoriale Regionale (Q.T.R.) - Regional Level:

The Quadro Territoriale Regionale (Q.T.R.) stands as the bedrock of regional planning, addressing overarching goals and principles for responsible development. By placing a strong emphasis on environmental preservation, soil defense, and risk prevention, the Q.T.R. provides a comprehensive guideline for sustainable territorial development in Calabria. It doesn't just lay down principles but identifies specific elements within naturalistic-environmental and settlement-related systems, offering a nuanced understanding of the regional landscape. Moreover, the acknowledgment of lands for civic and collective use and the delineation of transformation possibilities underscore its strategic significance.

Provincial Territorial Coordination Plan (P.T.C.P.) - Provincial Level:

Operating at the provincial level, the P.T.C.P. assumes a pivotal role in bridging regional policies with municipal planning. Beyond merely integrating guidelines and prescriptions, it meticulously analyzes and details the provincial territory, ensuring a nuanced approach. By defining principles for resource use, outlining development hypotheses, and identifying locations for interventions and conservation measures, the P.T.C.P. becomes a comprehensive guide. Its emphasis on compatibility among various forms of resource use reinforces the need for a harmonious and sustainable approach to development within the province.

Piano Territoriale della Città Metropolitana di Reggio Calabria (PTCM) - Metropolitan Level:

The PTCM takes the helm at the metropolitan level, serving as both a coordinating instrument and a broader planning tool for the Metropolitan City of Reggio Calabria. Its mandated role, defined by legal provisions, underscores its importance in the transitional phase from provincial to metropolitan planning frameworks. Collaborating closely with the Region, the PTCM integrates regional guidelines and aligns with landscape-oriented principles. By guiding policies, influencing municipal planning, and fostering collaboration through mechanisms like the Conferenza permanente Regione - Città metropolitana, the PTCM ensures a holistic and participatory planning process. Its provisions for territorial structure, development strategy, and sectoral policies contribute to sustainable development and protection at the metropolitan level.

Municipal Planning Tools - Municipal Level:

At the municipal level, Planning Instruments, especially the Municipal Structural Plan (PSC), play a crucial role in shaping local development. The PSC, acting as the governing document, goes beyond zoning regulations; it becomes a strategic document defining the character of the entire municipal territory. From classifying areas to regulating land use, from identifying infrastructure needs to safeguarding historical and environmental assets, the PSC provides a detailed roadmap. The inclusion of a geological component ensures sustainability, especially in areas prone to geological risks. The collaborative nature of planning across different levels ensures that municipal development aligns seamlessly with regional and provincial objectives, fostering comprehensive and sustainable growth.

Collaborative Level: Structural Plan in Associate form (PSA)

The Associative Structural Plan (PSA) is a collaborative planning tool that enhances integration among neighbouring local authorities facing similar territorial challenges. Operating beyond municipal boundaries, the PSA promotes coordination in planning initiatives, fiscal policies, and public works programming. It mirrors the Municipal Structural Plan in content and effects, emphasizing consistency. The establishment of a unified Planning Office ensures efficient collaboration, information exchange, and coherent planning efforts among participating municipalities.
The hierarchical structure of territorial planning in Calabria unfolds across multiple levels, each contributing to the cohesive and sustainable development of the region. At the regional level, the Quadro Territoriale Regionale (Q.T.R.) stands as a guiding directive, addressing environmental concerns, managing risks, and promoting

sustainable development while engaging various stakeholders. The provincial Piano Territoriale di Coordinamento Provinciale (PTCP) refines this vision, aligning provincial governance with regional objectives and providing a framework for harmonious development. The metropolitan Piano Territoriale della Città Metropolitana di Reggio Calabria (PTCM) extends this coordination to the metropolitan scale, fostering collaboration and coherence. At the municipal level, Municipal Planning Tools, particularly the Municipal Structural Plan (PSC), guide local development, ensuring alignment with regional and provincial objectives. The collaborative Structural Plan in Associate form (PSA) enhances integration among neighboring municipalities, emphasizing coordination, fiscal equity, and consistency. This multi-tiered approach ensures a comprehensive, participatory, and sustainable roadmap for the territorial development of Calabria.

The law also provides insights into the regulatory framework and strategic initiatives related to the logistics hub in Gioia Tauro. It highlights the significance of the National Strategic Plan for Port and Logistics (PSNPL) in shaping the development of the Gioia Tauro System, particularly the Economic Special Zone (ZES). The region aligns its planning within the Territorial Qualification Framework, demonstrating a commitment to landscape value and compliance with European, national, and regional legislative frameworks.

To manage the logistics hub, the Region aims to establish program agreements with the Gioia Tauro Port Authority and other entities through public competitions. These agreements are designed to encourage entrepreneurial activities and are regulated and promoted by the Region through specific regulations. The collaborative approach involving public and private stakeholders, along with the emphasis on clear guidelines through regulatory frameworks, reflects a strategic effort to leverage the economic potential of the logistics hub while ensuring sustainable and well-governed development.

Summing Up: Insights and Synthesis

In conclusion, this chapter, first, explored two interconnected themes: the concept of a city as a complex system and the importance of community-based approaches to resilience and socio-economic development. The concept of a city as a complex system highlights the inherent complexity, self-organization, and emergent properties of urban environments. The application of complexity theory and network perspectives has allowed researchers to gain insights into urban dynamics, growth, and planning, using computational models and simulation techniques. Moreover, the understanding of cities as complex systems is closely linked to the concept of resilience. Resilience emphasizes the capacity of cities to adapt, withstand shocks, and recover while maintaining essential functions. By adopting a systemic perspective and considering social, economic, and environmental dimensions, resilience approaches recognize the interdependencies and feedback loops within cities.

The chapter further discussed the importance of community-based approaches in fostering resilience and promoting socio-economic development. Community-based approaches involve engaging local communities in decision-making processes, empowering them to manage resources sustainably and address their evolving needs. Such approaches have been successful in various contexts, demonstrating the benefits of participatory management, social inclusion, and a sense of ownership in achieving positive outcomes.

However, certain regions still face challenges in implementing resilient approaches to resource and capability management. Factors such as inadequate governance and policy structures, socioeconomic disparities, and environmental pressures contribute to the lack of resilience in these regions. Addressing these challenges requires comprehensive strategies that empower local communities, promote inclusive urban development, and integrate social, economic, and environmental considerations.

Furthermore, the chapter highlighted the importance of socio-economic development theory in understanding and guiding urban regeneration initiatives. Socio-economic development theory provides frameworks for promoting economic growth, social progress, and human well-being within urban contexts. It emphasizes the need for participatory decision-making processes, capacity-building initiatives, and addressing social inequalities to achieve sustainable and equitable socio-economic development outcomes.

Regional disparities in socio-economic development are a persistent challenge that hinders equitable progress. These disparities can lead to unequal economic growth, income gaps, and limited access to basic services. Addressing regional disparities requires a comprehensive approach that focuses on infrastructure development, human capital investment, effective governance, and inclusive economic policies.

Moving forward, the chapter aimed to provide a better understanding of Italy's national disparities, with a specific focus on the challenges faced by the southern regions such as Calabria. Academic and political debates surrounding the underdevelopment of the southern regions have been ongoing, yet despite attempts to reduce the gap, it has been increasing.

The region's problems stem partly from a partial understanding of the nature of the regional problem and inadequate solutions in the past. Neglect has allowed these problems to spiral out of control. To address these challenges, specific policies are needed not only for the southern region but also for the territories within it. Overcoming the lag of southern Italy areas requires a multidisciplinary and place-based strategy that addresses geographic disadvantages, weak industrialization, corruption, and social backwardness. It is also essential to invest in infrastructure to boost logistics, which will create more jobs for the southern population and lay the foundation for new industries in the region. Additionally, interventions and interdisciplinary approaches in the health and education sectors are crucial for reviving prosperity in Southern Italy and the nation as a whole.

The exploration of Calabria's legal framework for the urban planning provides a crucial link between the broader discussion on resilience, regional challenges, and socio-economic disparities and the specific urban and coastal development strategies. The established legal framework reflects a commitment to responsible and inclusive development, emphasizing sustainable practices, transparency, and citizen engagement.

Noteworthy is the focus on "Urban Regeneration" plans and programs, aiming to requalify urban areas and foster territorial savings. The interconnectedness of the naturalistic-environmental, settlement, and relational systems is recognized, emphasizing the importance of viewing these systems in the broader context of potential relational continuity with adjacent regions.

Linking the regional law to the broader themes of the chapter, the exploration of resilience, community-based approaches, and regional challenges provides context for the significance of framework. The law becomes a tool to implement and regulate the

strategies discussed earlier, ensuring that sustainable development practices are not just ideals but are institutionalized within the planning processes.

In conclusion, the socio-economic and socio-ecologic aspects of the south of Italy, particularly in Calabria, present significant challenges that hinder their development and exacerbate inequalities within the country. Italy as a whole faces fragility in its economy, environment, and society, with slow productivity growth compared to other European countries. The south, in particular, suffers from a lack of infrastructure, low adoption of new technologies, and a decline in public and private investments. These factors contribute to a stagnant economy, high unemployment rates, and a higher prevalence of poverty and social exclusion.

Addressing these issues requires comprehensive reforms and strategic investments. For example, PNRR proposed by Italy, along with the Next Generation EU initiative, presents an opportunity to tackle these challenges and promote inclusive growth. However, successful implementation of the PNRR requires active involvement and cooperation from regional and local authorities. Ensuring effective governance, consultation, and coordination among all stakeholders is essential for the plan's success. It is crucial to empower the southern regions and involve them in decision-making processes to overcome the historical development gap and retain the region's human capital.

The successful utilization of available resources, effective governance, and a focus on sustainable development will be crucial in overcoming any obstacles and fostering balanced and inclusive growth. With concerted efforts and strategic investments, the south of Italy, including regions like Calabria, can overcome its socio-economic challenges and unlock its full potential, contributing to the overall development and prosperity of the country. Simultaneously, adopting community-based approaches, understanding cities as complex systems, and leveraging socio-economic development theory are essential for fostering resilience, promoting inclusive urban development, and addressing regional disparities. By embracing these concepts and implementing comprehensive strategies, Italy can work towards creating sustainable, resilient, and equitable cities and regions, ensuring a prosperous future for all its citizens.

References

Abernethy, Abernethy, K. E., Bodin, Ö., Olsson, P., Hilly, Z., & Schwarz, A. (2014). Two steps forward, two steps back: The role of innovation in transforming towards community-based marine resource management in Solomon Islands. Global Environmental Change, 28, 309–321.

Adger, W. N. (2000). Social and ecological resilience: Are they related? Progress in Human Geography, 24(3), 347–364.

Ahern, J. (2011). From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world. Landscape and Urban Planning, 100(4), 341–343.

Alampi Jr, M. (2007). Underdevelopment in Southern Italy: Traditional Setbacks and Modern Solutions.

Albanese, G., de Blasio, G., & Locatelli, A. (2021). Does EU regional policy promote local TFP growth? Evidence from the Italian Mezzogiorno. Papers in Regional Science, 100(2), 327–348.

Albert, R., & Barabási, A.-L. (2002). Statistical mechanics of complex networks. Reviews of Modern Physics, 74(1), 47.

Allan, C. H. (1957). Customary Land Tenure in the British Solomon Islands Protectorate: Report of the Special Lands Commission. (No Title).

Antonin, C., Guerini, M., Napoletano, M., & Vona, F. (2019). Italy: Escaping the high-debt and low-growth trap. OFCE.

Asso, P. F. (2020). New perspectives on old inequalities: Italy's north–south divide. Territory, Politics, Governance, 9(3), 346–364.

Astarita, T. (2005). Between Salt Water and Holy Water: A History of Southern Italy. New York : W.W. Norton & Company, 352.

Balland, P.-A., & Boschma, R. (2021a). Complementary interregional linkages and Smart Specialisation: An empirical study on European regions. Regional Studies, 55(6), 1059–1070.

Balland, P.-A., & Boschma, R. (2021b). Mapping the potentials of regions in Europe to contribute to new knowledge production in Industry 4.0 technologies. Regional Studies, 55(10–11), 1652–1666.

Banfield, E., & Fasano, L. (1958). The Moral Basis of a Backward Society. The Free Press.

Barthélemy, M. (2011). Spatial networks. Physics Reports, 499(1–3), 1–101.

Batty, M. (2007). Cities and complexity: Understanding cities with cellular automata, agent-based models, and fractals. The MIT press.

Batty, M. (2008). The size, scale, and shape of cities. Science, 319(5864), 769–771.

Batty, M., & Marshall, S. (2012). The origins of complexity theory in cities and planning. Complexity Theories of Cities Have Come of Age: An Overview with Implications to Urban Planning and Design, 21–45.

Berkes, F. (2007). Community-based conservation in a globalized world. Proceedings of the National Academy of Sciences, 104(39), 15188–15193.

Bertamino, F., Bronzini, R., De Maggio, M., & Revelli, D. (2017). Regional policies for innovation: The case of technology districts in Italy. Regional Studies, 51(12), 1826–1839.

Bettencourt, L. M., Lobo, J., Helbing, D., Kühnert, C., & West, G. B. (2007). Growth, innovation, scaling, and the pace of life in cities. Proceedings of the National Academy of Sciences, 104(17), 7301–7306.

Bevilacqua, C., Pizzimenti, P., Hamdy, N., & Mangiulli, F. (2022). From Deinstitutionalization to Community-Based Urban Development: Investigating Accessibility of Urban Systems in Calabria through Network Analytics. Sustainability, 14(3), 1348.

Beyerl, K., Putz, O., & Breckwoldt, A. (2016). The role of perceptions for community-based marine resource management. Frontiers in Marine Science, 3, 238.

Bifulco, L., & Centemeri, L. (2008). Governance and Participation in Local Welfare: The Case of the Italian Piani di Zona. Social Policy & Administration, 42(3), 211–227. https://doi.org/10.1111/j.1467-9515.2007.00593.x

Biggiero, L. (1998). Italian industrial districts: A Triple Helix pattern of problem solving. Industry and Higher Education, 12(4), 227–234.

Bigoni, M., Bortolotti, S., Casari, M., Gambetta, D., & Pancotto, F. (2016). Amoral familism, social capital, or trust? The behavioural foundations of the Italian North–South divide. The Economic Journal, 126(594), 1318–1341.

Blasi, S., Ganzaroli, A., & De Noni, I. (2022). Smartening sustainable development in cities: Strengthening the theoretical linkage between smart cities and SDGs. Sustainable Cities and Society, 80, 103793.

Brondizio, E. S., & Tourneau, F.-M. L. (2016). Environmental governance for all. Science, 352(6291), 1272–1273.

Bruce, A., & Clarson, D. (2017). Assessing the potential and limits of community-based initiatives in urban regeneration: Three decades of experience on Sheffield's Manor estate. Regional Studies, Regional Science, 4(1), 80–93. https://doi.org/10.1080/21681376.2017.1313129

Calabria, M. (2022). Italy Blue Economy. https://www.trade.gov/market-intelligence/italy-blue-economy

Cannari, L., & Franco, D. (2011). Il Mezzogiorno: Ritardi, qualità dei servizi pubblici, politiche. Stato e Mercato, 31(1), 3–40.

CBUPT. (2012). Community Based Urban Planning Toolkit (CBUPT) A Step-By-Step Approach to Community Based Urban Planning & Development in Zimbabwe. https://www.alnap.org/system/files/content/resource/files/main/51a4a069-8d54-48bd-b340-10230a000074.pdf

Chelleri, L., Waters, J. J., Olazabal, M., & Minucci, G. (2015). Resilience trade-offs: Addressing multiple scales and temporal aspects of urban resilience. Environment and Urbanization, 27(1), 181–198.

Chenery, H. B. (1962). Development policies for southern Italy. The Quarterly Journal of Economics, 515–547.

Dahms, T. (2010). Resilience and risk management. Australian Journal of Emergency Management, The, 25(2), 21–26.

Davoudi, S., Brooks, E., & Mehmood, A. (2013). Evolutionary resilience and strategies for climate adaptation. Planning Practice & Research, 28(3), 307–322.

Davoudi, S., Shaw, K., Haider, L. J., Quinlan, A. E., Peterson, G. D., Wilkinson, C., Fünfgeld, H., McEvoy, D., Porter, L., & Davoudi, S. (2012). Resilience: A bridging concept or a dead end?"Reframing" resilience: challenges for planning theory and practice interacting traps: resilience assessment of a pasture management system in Northern Afghanistan urban resilience: what does it mean in planning practice? Resilience as a useful concept for climate change adaptation? The politics of resilience for planning: a cautionary note: edited by Simin Davoudi and Libby Porter. Planning Theory & Practice, 13(2), 299–333.

Deakin, M. (2009). A Community-Based Approach to Sustainable Urban Regeneration. Journal of Urban Technology, 16(1), 91–112. https://doi.org/10.1080/10630730903090354

Del Monte, A., & Giannola, A. (1978). Il Mezzogiorno nell'economia italiana. Il mulino Bologna.

Emerson, E., & Hatton, C. (1994). Moving out: The impact of relocation from hospital to community on the quality of life of people with learning disabilities. (No Title). https://cir.nii.ac.jp/crid/1130000797781053824

Eraydin, A. (2012). "Resilience thinking" for planning. In Resilience thinking in urban planning (pp. 17–37). Springer.

Eraydin, A., & Taşan-Kok, T. (2013a). The Evaluation of Findings and Future of Resilience Thinking in Planning. In A. Eraydin & T. Taşan-Kok (Eds.), Resilience Thinking in Urban Planning (Vol. 106, pp. 229–239). Springer Netherlands. https://doi.org/10.1007/978-94-007-5476-8_14

Eraydin, A., & Taşan-Kok, T. (2013b). The Evaluation of Findings and Future of Resilience Thinking in Planning. In A. Eraydin & T. Taşan-Kok (Eds.), Resilience Thinking in Urban Planning (Vol. 106, pp. 229–239). Springer Netherlands. https://doi.org/10.1007/978-94-007-5476-8_14

European Commission. (n.d.-a). European Recovery Plan. Retrieved 24 September 2021, from https://commission.europa.eu/strategy-and-policy/recovery-plan-europe_en

European Commission. (n.d.-b). Report of the Ad Hoc Expert Group on the Transition from Institutional to Community-based Care handed over to Commissioner Spidla. Retrieved 2 November 2023, from https://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=614&

European Commission. (2010). Ex Post Evaluation of Cohesion Policy Programmes 2000–06 Co-fnanced by the ERDF (Objectives 1 & 2). https://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp9_vol2_national_case_studies.pdf

European Commission; Joint Research Centre. (2020). Annual Report 2019: Joint Research Centre, the European Commission's Science and Knowledge Service. Publications Office: Luxembourg.

European Committee of the Regions ., Spatial Foresight GmbH., & ÖIR GmbH. (2022). Small urban areas: A foresight assessment to ensure a just transition. Publications Office. https://data.europa.eu/doi/10.2863/12304

Farole, T., Goga, S., & Ionescu-Heroiu, M. (2018). Rethinking lagging regions.

Felice, E. (2018). The socio-institutional divide: Explaining Italy's long-term regional differences. Journal of Interdisciplinary History, 49(1), 43–70.

Felice, E., & Lepore, A. (2017). State intervention and economic growth in Southern Italy: The rise and fall of the 'Cassa per il Mezzogiorno'(1950–1986). Business History, 59(3), 319–341.

Ferraretto, V. (2019, October 1). The North Remembers. Italics Magazine. https://italicsmag.com/2019/10/01/the-north-remembers-differentiated-autonomy/

Fina, S., Heider, B., & Prota, F. (2021). Unequal Italy: Regional socio-economic disparities in Italy. 32.

Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. Global Environmental Change, 16(3), 253–267.

FORAY, D., & GOENAGA, B. X. (2013). The goals of smart specialisation. S3 Policy Brief Series No. 01/2013.

Fraccascia, L., Giannoccaro, I., & Albino, V. (2018). Resilience of complex systems: State of the art and directions for future research. Complexity, 2018.

Friscic, J. (2023, April 3). Role of the European Union in deinstitutionalisation and independent living. Inclusion Europe. https://www.inclusion-europe.eu/role-of-the-european-union-in-deinstitutionalisation-and-independent-living-easy-to-read/

Fujita, M., Krugman, P. R., & Venables, A. (2001). The spatial economy: Cities, regions, and international trade. MIT press.

Fujita, M., & Mori, T. (1996). The role of ports in the making of major cities: Self-agglomeration and hub-effect. Journal of Development Economics, 49(1), 93–120.

Gallup, J. L., Sachs, J. D., & Mellinger, A. D. (1999). Geography and economic development. International Regional Science Review, 22(2), 179–232.

Garud, R., Kumaraswamy, A., & Karnøe, P. (2010). Path dependence or path creation? Journal of Management Studies, 47(4), 760–774.

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research Policy, 36(3), 399–417.

Gibson, C. C., & Koontz, T. (1998). When "community" is not enough: Institutions and values in community-based forest management in southern Indiana. Human Ecology, 26(4), 621–647.

GIBSON, D., Angus, P., Braddock, D., Fortune, N., Johnstone, H., Madden, R., & Mason, F. (2001). Deinstitutionalisation: The Move Toward Community-Based Care. In Australias Welfare 2001: Services and Assistance (pp. 96–139). Australian Institute of Health and Welfare. https://researchprofiles.canberra.edu.au/en/publications/deinstitutionalisation-the-move-toward-community-based-care

Groen, W. P. D., Musmeci, R., & Gojsic, D. (2021). The Largest 50 Beneficiaries in each EU Member State of CAP and Cohesion Funds. 157.

Gunderson, L. H., & Holling, C. S. (2002). Panarchy: Understanding transformations in human and natural systems. Island press.

Hatton, C., Waters, J., Duffy, S., Senker, J., Crosby, N., Poll, C., Tyson, A., O'Brien, J., & Towell, D. (2008). A Report on In-Control's Second Phase. Evaluation and Learning 2005–2007. https://www.academia.edu/download/32852488/In_Control_Phase_Two_Report.pdf

Hidalgo, C. A. (2021). Economic complexity theory and applications. Nature Reviews Physics, 3(2), 92–113.

Holland, J. H., & Sigmund, K. (1995). Hidden order: How adaptation builds complexity. Nature, 378(6556), 453–453.

Hughes, T., Scott, K., & Maassen, P. (2017). Improving public services: Guidance for developing OGP commitments. Open Government Partnership. https://www.opengovpartnership.org/sites/default/files/OGP_public-service-guidance.pdf

Istat. (2018a). Istat: Conti economici territoriali. Anno 2017. https://scholar.google.com/scholar_lookup?title=Conti+Economici+Territoriali.+Anno+2017&author=Istat&publication_year=2018

Istat. (2018b). Istat: La Povertà in Italia. Anno 2017 [Statistiche Report]. https://scholar.google.com/scholar_lookup?title=La+Povert%C3%A0+in+Italia.+Anno+2017&author=Istat&publication_year=2018

Italia Domani. (2020). Piano Nazionale Di Ripresa e Resilienza. https://www.governo.it/sites/governo.it/files/PNRR_3.pdf

Iuzzolino, G., Pellegrini, G., & Viesti, G. (2011). Convergence among Italian regions, 1861-2011. Bank of Italy Economic History Working Paper, 22.

Jacobs, J. (1961). The Death and Life of Great American Cities. Randoms House, New York. Book Unpublished Resources.

Jaffee, D. (1998). Levels of socio-economic development theory. Bloomsbury Publishing USA.

Johannes, R. E. (2002). The renaissance of community-based marine resource management in Oceania. Annual Review of Ecology and Systematics, 33(1), 317–340.

Kim, S., Larson, S. A., & Charlie Lakin, K. (2001). Behavioural outcomes of deinstitutionalisation for people with intellectual disability: A review of US studies conducted between 1980 and 1999. Journal of Intellectual & Developmental Disability, 26(1), 35–50. https://doi.org/10.1080/13668250020032750

Kozma, A., Mansell, J., & Beadle-Brown, J. (2009a). Outcomes in different residential settings for people with intellectual disability: A systematic review. American Journal on Intellectual and Developmental Disabilities, 114(3), 193–222.

Kozma, A., Mansell, J., & Beadle-Brown, J. (2009b). Outcomes in different residential settings for people with intellectual disability: A systematic review. American Journal on Intellectual and Developmental Disabilities, 114(3), 193–222.

Krugman, P. (1999). The role of geography in development. International Regional Science Review, 22(2), 142–161.

Krugman, P., & Venables, A. J. (1995). Globalization and the Inequality of Nations. The Quarterly Journal of Economics, 110(4), 857–880.

Labaka, L., Maraña, P., Giménez, R., & Hernantes, J. (2019). Defining the roadmap towards city resilience. Technological Forecasting and Social Change, 146, 281–296.

Leonardi, R. (1995). Regional development in Italy: Social capital and the Mezzogiorno. Oxford Review of Economic Policy, 11(2), 165–179.

Leydesdorff, L. (2021). Regions, Innovations, and the North–South Divide in Italy. In The Evolutionary Dynamics of Discursive Knowledge (pp. 115–134). Springer.

Liu, J., Mooney, H., Hull, V., Davis, S. J., Gaskell, J., Hertel, T., Lubchenco, J., Seto, K. C., Gleick, P., & Kremen, C. (2015). Systems integration for global sustainability. Science, 347(6225), 1258832.

Loorbach, D., & Rotmans, J. (2010). The practice of transition management: Examples and lessons from four distinct cases. Futures, 42(3), 237–246.

Magnatti, P., Ramella, F., Trigilia, C., & Viesti, G. (2005). Patti territoriali. Lezioni per lo sviluppo. Il mulino.

Mansell, J., & Beadle-Brown, J. (2009). Dispersed or clustered housing for adults with intellectual disability: A systematic review. Journal of Intellectual and Developmental Disability, 34(4), 313–323.

Mansell, J., & Beadle-Brown, J. (2010). Deinstitutionalisation and community living: Position statement of the comparative policy and practice special interest research group of the international association for the scientific study of intellectual disabilities. Journal of Intellectual Disability Research, 54(2), 104–112.

Mansell, J., Knapp, M., Beadle-Brown, J., & Beecham, J. (2007). Deinstitutionalisation and community living–outcomes and costs: Report of a European Study. Volume 2: Main Report. University of Kent. https://eprints.lse.ac.uk/3460/1/Deinstitutionalisation_and_community_living_%E2%80%93_outcomes_and_costs_vol_2(lsero).pdf

Martinelli, F. (1985). Public policy and industrial development in southern Italy: Anatomy of a dependent industry. International Journal of Urban and Regional Research, 9(1), 47–81.

Martinelli, F. (2013). The Southern Question in Italy: Regional development discourses and strategies from'national'policy to'Euro-local'programmes. In Urban and Regional Development Trajectories in Contemporary Capitalism (pp. 242–267). Routledge.

Maryland Smith. (2021). Why Italy's Economy Stopped Growing. https://www.rhsmith.umd.edu/research/why-italys-economy-stopped-growing

Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. Landscape and Urban Planning, 147, 38–49.

Mitrică, B., Mocanu, I., Dumitraşcu, M., & Grigorescu, I. (2017). Socio-economic disparities in the development of the Romania's border areas. Social Indicators Research, 134, 899–916.

Munoz, J. C. (1997). Coastal resource management in the Philippines. Proceedings of the Regional Workshop on Coastal Fisheries Management Based on Southeast Asian Experiences, Chiang Mai, Thailand, 19-22 November 1996, 80–85.

Newman, M. E. (2003). The structure and function of complex networks. SIAM Review, 45(2), 167–256.

Nifo, A., & Vecchione, G. (2014). Do institutions play a role in skilled migration? The case of Italy. Regional Studies, 48(10), 1628–1649.

OECD. (n.d.). FOSTERING ECONOMIC RESILIENCE IN A WORLD OF OPEN AND INTEGRATED MARKETS: RISKS, VULNERABILITIES AND AREAS FOR POLICY

ACTION. https://www.oecd.org/newsroom/OECD-G7-Report-Fostering-Economic-Resilience-in-a-World-of-Open-and-Integrated-Markets.pdf

OECD. (2015). Local Economic and Employment Development (LEED). Monitoring the Transition to a Low-Carbon Economy. OECD LEED REPORT 2015, pp. 1–110. https://www.oecd.org/regional/Monitoring-Green-Transition-Final2.pdf

OECD. (2018). Regions and Cities at a Glance 2018 – ITALY. https://www.oecd.org/cfe/ITALY-Regions-and-Cities-2018.pdf

OECD. (2019). Can Social Protection Be an Engine for Inclusive Growth? OECD. https://doi.org/10.1787/9d95b5d0-en

OECD. (2021). Fostering Economic Resilience in a World of Open and Integrated Markets Risks, Vulnerabilities and Areas for Policy Action. https://www.oecd.org/newsroom/OECD-G7-Report-Fostering-Economic-Resilience-in-a-World-of-Open-and-Integrated-Markets.pdf

OECD. (2016). OECD Science, Technology and Innovation Outlook. OECD (OECD Science, Technology and Innovation Outlook). https://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-innovation-outlook-2016_sti_in_outlook-2016-en

Official Journal of the European Union. (2021). Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility. http://data.europa.eu/eli/reg/2021/241/oj/eng

Park, J., Seager, T. P., Rao, P. S. C., Convertino, M., & Linkov, I. (2013). Integrating risk and resilience approaches to catastrophe management in engineering systems. Risk Analysis, 33(3), 356–367.

Pellegrino, B., & Zingales, L. (2017). Diagnosing the Italian Disease. https://www.nber.org/system/files/working_papers/w23964/w23964.pdf

Pelling, M., & Manuel-Navarrete, D. (2011). From resilience to transformation: The adaptive cycle in two Mexican urban centers. Ecology and Society, 16(2).

Petraglia, C., & Provenzano, G. (2018, January 31). L'Italia e la Politica di Coesione post-2020. https://www.rivistailmulino.it/news/newsitem/index/Item/News:NEWS_ITEM:4237

Poll, C., Duffy, C., Hatton, C., Sanderson, H., & Routledge, M. (2006). A report on in Control's first phase, 2003-2005. London, in Control Publications. Waters, J. and Duffy, S.(2007) Individual .... https://www.academia.edu/download/32852404/In_Control_Phase_One_Report_2003-2005.pdf

Popolazione Calabria (2001-2021) Grafici su dati ISTAT. (n.d.). Tuttitalia.it. https://www.tuttitalia.it/calabria/statistiche/popolazione-andamento-demografico/

Porter, M. E. (2011). Competitive advantage of nations: Creating and sustaining superior performance. simon and schuster.

Portugali, J. (2021). Handbook on cities and complexity. Edward Elgar Publishing. https://books.google.com/books?hl=en&lr=&id=1dBCEAAAQBAJ&oi=fnd&pg=PR1&dq=+Moroni+S.,+Chiffi+D.:+Complexity+and+uncertainty:+implications+for+urban+planning.+In+Portugali,+J.+(Ed.).+(2021).+Handbook+on+Cities+and+Complexity.+Edward+Elgar+Publishing&ots=9aAB7z2JNG&sig=rvxpYVE7K0Yh9kRFJcXewDc7vkk

Portugali, J., Meyer, H., Stolk, E., & Tan, E. (2012). Complexity theories of cities have come of age: An overview with implications to urban planning and design.

Prota, F., & Grisorio, M. J. (2018). Public expenditure in time of crisis: Are Italian policymakers choosing the right mix? Economia Politica, 35(2), 337–365.

Prota, F., & Viesti, G. (2013). Which European investment clause. Social Europe Journal, 28, 2013.

Provvisiero, G. (2022, August 3). Le Regioni nella governance del PNRR. Italian Papers on Federalism. https://www.ipof.it/le-regioni-nella-governance-del-pnrr/

Regione Calabria. (n.d.). Welfare Calabria, Piano Sociale 2020–2022. Retrieved 2 November 2023, from https://sisrc.regione.calabria.it/sac/pianoTriennaleInterventi

Regione Campania. (n.d.). Nuovi ambiti sociali territoriali, chiarimenti e indicazioni—Regione informa. Retrieved 2 November 2023, from https://regione.campania.it/regione/it/news/regione-informa/nuovi-ambiti-sociali-territoriali-chiarimenti-e-indicazioni?page=1

Regione Lombardia. (n.d.). Piano dei Servizi, Linee Guida alla Redazione. https://www.regione.lombardia.it/wps/wcm/connect/80e446dd-c205-460b-b4e5-9d39df50dafc/Piano+dei+Servizi+-+Linee+guida+alla+redazione.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-80e446dd-c205-460b-b4e5-9d39df50dafc-mlYcJMn

Rodríguez-Pose, A. (2005). Is R&D investment in lagging areas of Europe worthwhile? Theory and empirical evidence*. Papers in Regional Science, 80(3), 275–295. https://doi.org/10.1111/j.1435-5597.2001.tb01800.x

Rodríguez-Pose, A., & Ketterer, T. (2020). Institutional change and the development of lagging regions in Europe. Regional Studies, 54(7), 974–986. https://doi.org/10.1080/00343404.2019.1608356

Rodríguez-Pose, A., & Wilkie, C. (2019). Innovating in less developed regions: What drives patenting in the lagging regions of Europe and North America. Growth and Change, 50(1), 4–37. https://doi.org/10.1111/grow.12280

Rolfo, S., & Calabrese, G. (2006). From national to regional approach in R&D policies: The case of Italy. International Journal of Foresight and Innovation Policy, 2(3–4), 345–362.

Rosés, J. R., & Wolf, N. (2018). Regional economic development in Europe, 1900-2010: A description of the patterns.

Schalock, R. L., Brown, I., Brown, R., Cummins, R. A., Felce, D., Matikka, L., Keith, K. D., & Parmenter, T. (2002). Conceptualization, measurement, and application of quality of life for persons with intellectual disabilities: Report of an international panel of experts. Mental Retardation, 40(6), 457–470.

Servidio, A. (2014). L'intervento straordinario nel Mezzogiorno « L'Italia tra unita' e liberta'. https://web.archive.org/web/20140207054548/http:/www.criticastorica.it/opera/volume-iv-liberta-e-centrismo/cap-ii-il-nuovo-decollo/intervento-straordinario-nel-mezzogiorno

Sharifi, A., & Yamagata, Y. (2022). Smart cities and climate-resilient urban planning. In Environment and Planning B: Urban Analytics and City Science (p. 23998083221102400). SAGE Publications Sage UK: London, England.

Simmie, J. (2012). Path dependence and new technological path creation in the Danish wind power industry. European Planning Studies, 20(5), 753–772.

Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. Global Environmental Change, 16(3), 282–292.

Smith, B., Fox, M., Naisilisili, W., Dulunaqio, S., & Jupiter, S. (2011). Status of cetaceans in the Vatu-i-Ra Seascape and the development of local capacity for their research and conservation. Wildlife Conservation Society, Fiji. Www. Wcsfiji. Org (Accessed on 25 May 2013).

Statista. (2021). Italy: GDP by region 2021. Statista. https://www.statista.com/statistics/793266/gdp-in-italy-by-region/

Storper, M. (1997). The regional world: Territorial development in a global economy. Guilford press.

SVIMEZ. (2019). Rapporto SVIMEZ. L'economia e la società del Mezzogiorno, Bologna.

Svimez, R. (2017). Rapporto sull'economia del Mezzogiorno, il Mulino. Bologna.

Trapani, M. (2021). La governance del PNRR e le Regioni (2/2021). https://www.osservatoriosullefonti.it/rubriche/fonti-regioni-ordinarie/4113-osf-2-2021-regioni-3

United Nations. (n.d.). Department of Economic and Social Affairs Sustainable Development. Retrieved 2 November 2023, from https://sdgs.un.org/

Urban Europe. (2020). Joint European Solutions, Transition towards Sustainable and Liveable Urban Futures. The Strategic Research and Innovation Agenda of JPI Urban Europe. Urban Transformations, 2(1), 10.

We Build Value Digital Magazine. (2019, July 31). Italy lags behind on transport infrastructure investments. We Build Value. https://www.webuildvalue.com/en/global-economy-sustainability/italy-inadequate-infrastructure-holds-back-the-economy.html

Wheeler, S. M. (2000). Planning for metropolitan sustainability. Journal of Planning Education and Research, 20(2), 133–145.

Wilson, M. G., Lavis, J. N., & Guta, A. (2012). Community-based organizations in the health sector: A scoping review. Health Research Policy and Systems, 10(1), 36. https://doi.org/10.1186/1478-4505-10-36

World Bank. (2018). Poverty and shared prosperity 2018: Piecing together the poverty puzzle. The World Bank.

Young, L., Sigafoos, J., Suttie, J., Ashman, A., & Grevell, P. (1998). Deinstitutionalisation of persons with intellectual disabilities: A review of Australian studies. Journal of Intellectual & Developmental Disability, 23(2), 155–170. https://doi.org/10.1080/13668259800033661

Zeng, X., Yu, Y., Yang, S., Lv, Y., & Sarker, M. N. I. (2022). Urban resilience for urban sustainability: Concepts, dimensions, and perspectives. Sustainability, 14(5), 2481.

2. A Sustainable Blue Economy

Abstract

Blue Economy has attracted attention for its capacity to support industries, communities, and ecosystems. This chapter is dedicated to the theme of a Sustainable Blue Economy. It explores the intricate interplay between economic growth and environmental sustainability within the context of the oceanic domain. The chapter opens with an examination of the concept of Blue Growth. It then delves into the relationship between the Blue Economy, the Green Economy, and the SDGs. The discussion proceeds to a pivotal shift from conventional "Blue Growth" to a more sustainable Blue Economy, emphasizing the transformation required to ensure long-term environmental integrity. Within this transformative shift, Maritime Spatial Planning (MSP) is explored as a comprehensive strategy for sustainable ocean management. Furthermore, ecosystem services take centre stage, with a particular focus on their role within a Sustainable Blue Economy. The economic valuation of marine ecosystem services is examined, shedding light on their significance and potential economic benefits. The chapter then gets closer to the case study by casting a spotlight on the Mediterranean area, with a specific emphasis on the Italian Blue Economy and its integration into PNRR. In the final segment, the chapter explores the potential of a community-based approach for the sustainable management of Blue resources in Italy, contributing to the development of a holistic and harmonious oceanic ecosystem.

2.1. Blue Growth: Balancing Economic Growth and Environmental Sustainability for a Sustainable Ocean Economy

The currently observed changes to the earth system are unprecedented in human history. Since World War II, the world's population has soared and a conflict between economic growth and environmental protection has emerged (dell'Ambiente, 2017). The population has a tremendous impact on water, energy usage, agricultural lands, and the environment (Sachs, 2015b). Cities grapple daily with issues related to the management of water systems and water scarcities (Resilient Cities, 2019), electricity shortages (by the impact on hydropower and plant cooling), and water-related diseases (through the use of contaminated water) (Van Staden, 2014). As human pressure on the Earth system accelerate, unexpected critical global, regional, and local impacts are likely to appear (Pecl et al., 2017; Takakura et al., 2019). Hence, Sustainable Development Goals (SDGs) were born in 2015 to protect our planet, end poverty, and ensure that all people enjoy peace and prosperity. Additionally, the adaptation of Paris Agreement is another step to keeping global warming under two degrees Celsius and strengthening countries' ability to cope with the impacts of climate change (European Commission, 2019). The question, however, remains; can economic growth be reconciled with environmental sustainability? Although the Sustainable Development trajectory can be achieved, there is the risk of pursuing one at the expense of the others (Rockström et al., 2013). In other words, some goals could be easily achieved while disregarding the environment.

A sustainable ocean-based economy can play a crucial role in keeping 1.5 degrees within reach while providing jobs, reducing inequality, supporting food security, sustaining biodiversity, and boosting resilience (Lubchenco & Gaines, 2019; Virdin et al., 2021; Visbeck, 2018). Oceans are the Earth's largest natural carbon sink (Raven & Falkowski, 1999). They absorb roughly 93 per cent of the heat that comes from any greenhouse gas emissions. The oceans have already absorbed 30 per cent of total anthropogenic CO_2 emissions since the 1980s (Gattuso et al., 2018). Thus, they are an essential regulator when it comes to global warming. However, this continued warming has led to rising acidification, ocean warming, and damage to its critical ecosystem (S. E. Ford, 1996). It, therefore, places some management emphasis on resilience as an essential design feature in an uncertain world that is not only about bouncing back but is to be prepared (Berkes et al., 2008).

Oceans cover around 71 per cent of our planet, and areas in the coastal waters around the margins of the continents are considered the most productive areas (Sherman, 1991). These areas encompass 66 naturally occurring large marine ecosystems[3], which together produce 75 per cent of global marine fish catches and contribute more than 12 trillion US dollars annually to the global economy (Costanza et al., 1997). However, these rich coastal seas face increasing threats from impacts like climate change, overfishing, and marine pollution, undermining the services humans require from healthy marine ecosystems (Halpern et al., 2007). Thus, there has been a very narrow focus on managing most marine activities (Aburto et al., 2012). The aim is to sustain the production potential for ecosystem goods and services, rather than managing single

[3] The world's oceans have been divided into 66 Large Marine Ecosystems (LMEs). These are defined as near coastal areas where primary productivity is generally higher than in open ocean areas (Kelley, 2016).

commodities without regard to the impacts on other parts of the ecosystem (Guerry, 2005). This means that multiple spatial scales need to be considered, and the perspectives need to be long-term rather than more typical short-term views that influence sectoral interests. So, from here, the globe started to shed light on the so-called "Blue Growth" and those interconnections between different sectors. Scholars and activists started looking for achieving win-win efficiency for all sectors. As to measure the efficiency of one sector and achieving its growth, it has to be measured with at least one more sector.

Blue Growth is a relatively new framework for ocean management (Burgess et al., 2018a; Eikeset et al., 2018a; Soma et al., 2018). The roots of its concept can be traced back to the concept of Sustainable Development (SD). SD started in the 1960s as a challenge to start achieving sustainable use of natural resources while at the same time securing social and economic developments. Since then, there have been three milestones in the development of SD. First, at the first United Nations (UN) conference on SD in Stokholm in 1972, the environmental dimension was defined. Then, the economic dimension was the spot in Rio 1992 at the second UN conference on SD. Lastly, in 2002 in Johannesburg, the social dimension was defined at the third UN conference on SD. At Rio+ 20 that was held in Rio in 2012, Blue Growth as a new concept was first conceived and took centre stage. This concept was a start to push governments to begin thinking about how to use the natural resources in oceans by combining the aspects of economic growth and environmental sustainability. Blue Growth implies making better use of the oceans via improved natural resource management across different sectors (Klinger et al., 2018). After the Blue Growth concept was introduced at the Rio+ 20 conference, it has been widely used and become necessary in aquatic development in many countries, regionally and internationally (Eikeset et al., 2018a).

Smith-Godfrey identified Blue Growth as "the sustainable industrialisation of the oceans to the benefit of all" (Smith-Godfrey, 2016a). It connects the different ocean industries (Burgess et al., 2018b), for instance, fishing, shipping, tourism, and marine ecosystem services such as coastal protection and carbon storage (Burgess et al., 2018b). Understanding such interactions (e.g., shipping impacts on the fishing industry) helps manage all components together, which tends to produce optimal outcomes at the system level (Barbesgaard, 2018). However, this imposes challenges rooted mainly in complexity and scale (Spangenberg, 2005). Although these challenges are surmountable, they demand a pragmatic approach (Kopetz, 2008). Such an approach explicitly recognises the existence of underexplored potentials.

Before the COVID-19 pandemic hit, Blue Growth industries such as fishing, energy, shipping, and tourism had been estimated to contribute 2.5 per cent of world gross value-added; that value was predicted to double by 2030 (OECD, 2016a). However, the pandemic has hit hard the ocean sectors and global supply chains (Northrop et al., 2020). For example, the maritime tourism sector was one of the first sectors affected by the outbreak, with global reporting of COVID-19 cases among crew members and passengers on cruise ships (Moriarty et al., 2020). Moreover, the linkages between blue sectors and land-based industries mean that the pandemic has broader impacts beyond these individual sectors but across the entire economy (Northrop et al., 2020). Therefore, a sustainable and holistic recovery strategy is critical for the well-being and resilience of communities and economies at large.

Recognizing this imperative, the EU has demonstrated a steadfast commitment to fostering cohesion and sustainable growth across its regions (Panaitescu, 2020). This

commitment materialized in 2014 with the establishment of the European Maritime and Fisheries Fund (EMFF), designed to align with the Europe 2020 strategy's objectives for smart, sustainable, and inclusive growth. In response to evolving challenges and opportunities, the European Commission has recently proposed the renewal of this fund, rebranded as the European Maritime Fisheries and Aquaculture Fund (EMFAF) for the 2021-2027 period.

The EMFAF represents a pivotal component of the European Union's broader vision, aligning with the goals of the European Green Deal and contributing significantly to achieving Sustainable Development Goal 14 (European Commission, 2018a). This fund is strategically positioned to propel the growth of the BE on multiple fronts (European Parliament, 2021). It not only supports fishers in their transition toward sustainable practices but also encourages coastal regions to diversify their economies. Furthermore, by financing projects along European coasts, the EMFAF creates new job opportunities while simultaneously promoting the development of sustainable aquaculture(FEAP, 2020). In essence, the EMFAF embodies a comprehensive strategy aimed at unleashing the growth potential of a sustainable BE, paving the way for a more prosperous future for coastal communities and fostering economic resilience on a global scale.

In conclusion, the concept of Blue Growth offers a promising pathway to balance economic growth and environmental sustainability in the context of our ocean-based economy. As we navigate the challenges posed by the COVID-19 pandemic and the complex interplay between blue sectors and land-based industries, it becomes increasingly clear that a holistic and sustainable approach is essential. The EU's commitment to this vision, as exemplified by EMFAF, serves as a beacon of hope. Harnessing the potential of the ocean-based economy ensures the well-being and resilience of coastal communities and also contribute to global efforts aimed at achieving SDGs and addressing climate change. In this evolving landscape, the synergy between economic prosperity and environmental stewardship is not just an aspiration but an imperative for the prosperous and sustainable future we all aspire to achieve.

2.2. Blue Economy, Green Economy, and SDGs

The concept of the blue economy or blue growth emerged as a response to the shortcomings of the green economy, which failed to adequately account for the significance of marine and ocean environments in national and economic contexts (Brundtland, 1987). Both concepts share a common foundation in recognizing that traditional economic models do not fully incorporate the diverse range of resources and values essential for a thriving economy that supports societal well-being (Brundtland, 1987).

BE has been gaining traction and has been embraced by prominent international organizations such as the World Bank, the Organisation for Economic Cooperation and Development (OECD), and the United Nations (UN) (Voyer et al., 2018a). However, its definition remains somewhat nebulous (Eikeset et al., 2018b), often adapting to the preferences and needs of different stakeholders (Carver, 2020; Cisneros-Montemayor et al., 2021; Silver et al., 2015). Similar to the green economy, which initially prioritized economic growth over ecological, social, and political dimensions of sustainability (Wanner, 2015), BE has faced criticism for pursuing sustainable development through the intensive exploitation of natural resources in many regions and sectors (Andriamahefazafy et al., 2020), with limited evidence of progress towards true sustainability.

This paradox of seeking sustainable development through growth-driven exploitation strategies can disproportionately benefit powerful actors, often at the expense of the environment and local communities. Some instances show economic gains leading to negative consequences for natural resources and dependent communities are prevalent in the literature (Okafor-Yarwood et al., 2020).

Sustainability itself is a complex concept, and achieving progress toward sustainability has proven challenging. In response to this complexity, the SDGs were unanimously adopted, recognizing that societal issues like poverty, gender inequality, and poor well-being are interconnected with natural world conditions and human interactions with it (United Nations, 2015a). SDGs encompass a range of interconnected targets, many of which are indivisible and closely linked to complex social-ecological relationships necessary for just sustainability (Nilsson et al., 2016). These interdependencies are also reflected in the connections the SDGs have with other areas of international law, such as human rights and biological diversity (CBD, 1992; Morgera, 2020).

While achieving SDG 14 (life below water) is crucial for BE, it cannot be pursued in isolation from the broader spectrum of interconnected goals (Lee et al., 2020b). SDG 14 has faced criticism for its narrow focus on ecological conditions and its limited capture of the social-ecological context in which drivers of marine biodiversity decline operate (Ntona & Morgera, 2018).

To actualize sustainable visions of blue economies, interpretations must align with the specific locations and communities in which they are implemented. This alignment is crucial to match the available resources and cultural context, ensuring that sustainability meets the needs of those directly involved in or impacted by a BE (Cisneros-Montemayor et al., 2021).

Calls have been made to ensure that the progression of the BE aligns with other established sustainability policies, such as the globally mandated SDGs, to ensure that it fosters the conditions necessary for the sustainable use of natural resources (Sarker et al., 2018). As many blue economies are still in their infancy, there exists a policy window for natural and social sciences to contribute to its definition in a manner that aligns with sustainability goals and prevents misuse or misinterpretation (Eikeset et al., 2018b; Rose et al., 2020).

BE presents a duality, offering avenues for growth and development while also highlighting the need for protective measures in vulnerable areas. Balancing these conflicting perspectives is crucial. SDGs emphasize the importance of inclusive and environmentally sustainable economic development, highlighting the need to consider the economic, social, and environmental dimensions of sustainable development in relation to oceans. The UN has designated the period from 2021 to 2030 as the 'Decade of Ocean Science for Sustainable Development' to support efforts in reversing the decline in ocean health and promoting sustainable development (Ryabinin et al., 2019). The World Bank emphasizes the "triple bottom lines of sustainable development" in the BE, aiming for a balance between economic, social, and environmental aspects (World Bank, 2017). However, achieving this balance is challenging due to the significant decline in ocean health caused by human activities and conflicting goals, such as pollution and unsustainable fishing.

The concept of BE intersects with various disciplines and necessitates reassessment of the environment and economy in the face of ecological and planetary boundaries. Linking the BE to the UN's SDGs is particularly challenging, given potential conflicts between individual or industrial goals and sustainability objectives (Lee et al., 2020b). Identifying the scope, boundaries, and key stakeholders of BE aligned with the UN's

SDGs is complex but crucial for setting achievable goals and targets and promoting societal development while safeguarding the biosphere.
The concept of BE and its connection to SDGs provides a framework for developing locally relevant but globally impactful strategies. This broader view enables a better understanding of how these two concepts can work together to solve sustainability problems.
When stakeholders' alignment with the BE-SDGs link is clear, it helps reduce uncertainty and mitigate negative effects caused by misalignment or conflicting goals. A pragmatic solution to address the complexities of this link suggests adopting an incremental approach based on the perceived materiality of each SDG by key stakeholders. However, there are additional challenges concerning the time horizon (short-term versus long-term) and the levels of commitment and interest from key stakeholders in the BE-SDGs association (Voyer et al., 2018a). Achieving the SDGs by 2030, as envisioned, poses a significant time constraint for eradicating poverty, protecting the planet, and promoting economic growth. Therefore, it is necessary to reevaluate current approaches in the BE and call for future inquiries to ensure effective implementation of the SDGs (Griggs et al., 2013). By considering the interconnections between the BE and SDGs and actively involving all relevant stakeholders, we can strive towards a more sustainable and prosperous future.

2.3. A shift from Blue Growth to a Sustainable Blue Economy

UN's Sustainable Development Goal 14, as well as the European Commission's Green Deal, emphasize the importance of sustaining ocean activities that generate economic wealth to support the growth of the ocean economy. It is important, however, to avoid adding more pressure to the ocean and its ecosystem services as a result of the growth of maritime-related activities (D.-G. for M. A. and F. European Commission, 2021; UNESCO, 2022).
As was discussed in the previous section, Blue Growth was first introduced as a long-term strategy to support sustainable growth in the marine and maritime sectors. The strategy arose from the need to manage systems holistically where socioeconomic and ecological components are strongly intertwined through complex patterns. Addressing climate change, understanding ecosystem function, and managing sustainability require more tangible strategies and initiatives. The European Commission (DG MARE) applied the Blue Growth strategy to support the sustainable growth of the marine and maritime sectors. The strategy was launched in 2012 putting oceans and seas at centre stage. The commission identified five key sectors having a high economic growth potential, namely aquaculture, coastal tourism, marine biotechnology, renewable energy, and mineral resources with other sectors that are crucial for value and jobs. Since then, the strategy has been evolving to keep up with the challenges and opportunities faced by all sectors. The European Commission Directorate General for Maritime Affairs and Fisheries has launched 5 editions of BE Report to offer a comprehensive overview of the latest trends in the EU's BE sectors.
According to the Communication on Sustainable BE in 2021, there was a need to shift from "blue growth" to a "sustainable Blue Economy" (D.-G. for M. A. and F. European Commission, 2021). In the communication, it was mentioned that the ocean and BE it supports is essential to achieve the transformation set out in the European Green Deal. Thus, in May 2021, the new approach for a sustainable BE in the EU was adopted (see figure 3).

The European Commission on 17 May 2021 announced a communication that aims to integrate ocean policy into Europe's new economic policy, as well as to make the so-called "blue economy" an integral part of the European Green Deal (D.-G. for M. A. and F. European Commission, 2021). As a starting point, the communication assumes that there is no longer any need for a dualism between environmental protection and economy in the context of today's world. In order to achieve this shift, economic activities at sea and along coasts need to reduce their cumulative impacts on the marine environment. Value chains need to change in order to contribute to climate neutrality, zero pollution, circular economy and waste reduction, marine biodiversity, coastal resilience, and responsible food production (Interreg Europe, 2022). BE advocates emphasize sustainability as a core plank, describing this as a paradigm shift from purely extractive and exploitative approaches. A sustainable BE promotes "effective protection, sustainable production, and equitable prosperity" of ocean-based activities (Ocean Panel, 2020).

Fig. 3. Sustainable Blue Economy Timeline.

Source: (European Commission Oceans and Fisheries platform)

Sustainability takes on various forms, it is not a one-size-fits-all concept; the specific forms and strategies of sustainability will vary depending on the goals, resources, and challenges of a particular situation or context. As BE develops, sustainability needs to be built around the principle of equitable use and exploitation of resources, establishing a bridge between the economic theory behind the growth and the social and ecological factors leading to a sustainable vision for the future (Lillebø et al., 2017). Some marine resources are scarce, and they are becoming increasingly valuable. This places a certain urgency on strategies that ensure the protection of marine resources and traditional economic activities while enabling the development of innovative applications and services in emerging and new areas. Moreover, it was argued that sustainability is community-based and needs to take into account local needs and priorities (Voyer et al., 2018b). A discourse on sustainability must consider the properties of socio-ecological systems as well as their interaction with marine and coastal environmental and geophysical characteristics. Developing a collective vision of sustainable futures is essential to promoting and facilitating a transition towards a sustainable BE (Clark & Harley, 2020).

The global significance of BE is indisputable, offering substantial economic development, job opportunities, and potential for investment, particularly for local communities. It is estimated that the current value of the global BE is €1.32 trillion, which is expected to double by 2030. In addition, it contributes 2.5% of global GDP and employs 1.5% of the world's workforce. Furthermore, it can alleviate land resource pressures and foster climate change mitigation and adaptation. The development of and promotion of sustainable BE activities is therefore imperative. This study is a step to understanding BE in one of the least developing regions that has an abundance of marine and sea resources.

Creating a sustainable BE will require closer engagement with stakeholders, including companies of all sizes, local groups, and young people passionate about ocean health. With this, society can benefit from the oceans and coastal regions while respecting their long-term capacity to regenerate and endure such activities (Addamo, A.,et al., 2022).
Developing a sustainable BE requires interaction and alignment with other EU policies (e.g. Common Fisheries Policy) as well as actions such as the Biodiversity and Farm-to-Fork strategies, the Marine Strategy Framework Directive, the Habitat and Birds Directives, Zero Pollution Action Plan, and REPowerEU (Addamo, A.,et al., 2022).
Italy, with its National Operational Program FEAMPA 2021-2027 will focus on the following four priorities: promote sustainable fisheries and the restoration and conservation of aquatic biological resources; promote sustainable aquaculture activities and the processing and marketing of fishery and aquaculture products, contributing to food security in the union; enable a sustainable BE in coastal, island and inland areas and promote the development of fisheries and aquaculture communities; and strengthen international ocean governance and enable safe, secure, clean and sustainably managed seas and oceans (FEAMPA, 2021).
In conclusion, It is recognized that oceans and water provide a variety of bioproducts and materials for numerous industries, as well as supporting the livelihoods of coastal communities and sea-related value chains (Friedman et al., 2020; Van Hoof et al., 2019). A changing climate further exacerbates existing pressures resulting from marine pollution, unsustainable resource use, or illicit activities. Oceans and their natural capital are vulnerable to cumulative pressures from human activities. Increasing concerns over climate change and human activities have led to increased interest in the BE, particularly the services provided and regulated by the ocean. Hence, BE holds the promise of fostering opportunities for sustainable economic development. Through BE, marine environment can be rehabilitated while at the same time benefiting our coastal communities as well as the economy at large.

2.4. Maritime Spatial Planning: A Holistic Approach for Sustainable Ocean Management

In light of the EU Blue Growth Strategy initiated in 2012, the European seas and oceans have emerged as vital contributors to the region's economy and as sources of significant innovation potential (Ecorys & Développement, 2012). A key instrument in advancing sustainable Blue Growth and addressing its associated challenges is Maritime Spatial Planning (MSP). This strategic approach has garnered support from the Blue Growth Strategy for instilling greater investor confidence and certainty.
Particularly, MSP in its ecosystem-based form is recognized as a process that guides the spatial distribution of activities in maritime areas. It seeks to accommodate existing and emerging uses while mitigating spatial conflicts, preserving ecosystem health and services, and securing these resources for future generations (Foley et al., 2010). The economic advantages of MSP are far-reaching, encompassing enhanced certainty for private sector investments and streamlined transparency in permitting and licensing procedures. It is a vital policy framework that acts as a linchpin between human activities and the management of their impact on the marine environment (Ramirez-Monsalve & van Tatenhove, 2020).
MSP serves as a strategic planning tool, driven by policies, permits, and administrative decisions that define the spatial and temporal distribution of current and future activities within marine areas (European Commission, 2020a). By promoting coherence and revealing synergies and trade-offs among various ocean uses, MSP infuses

strategic foresight into decisions regarding the utilization of maritime expanse. At its core, MSP harmonizes the interests, societal needs, values, and objectives of diverse sectors. This modern, holistic, and cohesive approach ensures the sustainable management of several sea areas (Addamo, A.,et al., 2022).

The development of a spatial vision is a critical component of the MSP process, serving as a means to anticipate future uses and to establish long-term planning objectives (The European MSP Platform). Such a vision is invaluable for: 1) Raising awareness of emerging issues in maritime sectors.2) Coordinating the efforts of diverse authorities responsible for different sectors and issues. 3) Engaging stakeholders, especially in cases where MSP is a new undertaking. 4) Providing a long-term perspective for MSP that transcends political cycles. 5) Accounting for future uses not currently present. 6) Enhancing the integration of land-sea planning (Addamo, A.,et al., 2022).

The EU MSP Directive forms the legal framework for the development of MSPs, with Member States creating maritime spatial plans within their jurisdictional marine waters. The adoption and implementation of this Directive have positioned the EU as a global leader in MSP development. These plans embrace a holistic approach, involving stakeholders, cross-border cooperation, and an ecosystem-based approach, facilitating the coexistence of activities and land-sea interaction while undergoing periodic reviews.

Despite certain legal obligations stemming from the EU MSP Directive, Member States retain the freedom to design the format and content of their maritime spatial plans, including institutional arrangements and the allocation of maritime activities (The European MSP Platform).

The vast array of sectors in the maritime economy, each with its unique characteristics and dynamics, leads to varying spatial implications, both present and future. Thus, MSP plays a crucial role in supporting emerging sectors like ocean energy and aquaculture by providing a platform for these sectors to communicate their spatial needs and importance to stakeholders. Even mature sectors, such as fisheries, shipping, and tourism, undergo transformation due to global changes and technological advancements, necessitating adjustments in spatial requirements. Several sectors, like ocean energy, aquaculture, and oil & gas, heavily rely on specific resource potential, requiring a balance between stability and adaptive planning. While MSP is a potent tool for promoting Blue Growth, it is important to acknowledge its limitations (European MSP Platform & European Commission). While indicators can logically connect MSP processes and Blue Growth, establishing direct causal relationships between specific sectors and MSP can be complex. The MSP for Blue Growth Final Technical Study conducted by the European commission in 2018 offers adaptable tools to support MSP processes, emphasizing the need for customization to suit the unique characteristics of each country and sea-basin.

The indicators vary from one Member State to another, depending on their specific alignment with national Blue Growth and MSP objectives. Indicators should be tailored to the specific needs and objectives of each Member State. Because MSP requirements and processes can significantly differ from one country to another, indicators can effectively assist MSP authorities when they are interpreted within the context of agreed country-specific goals and targets. This includes considering factors such as the level of stakeholder engagement or the involvement of neighbouring countries in the MSP planning process. The process for developing indicators is crucial across its various steps. The Handbook on MSP Indicators Development in the Technical Study of MSP

for Blue Growth provide suggestions on how to link MSP processes and Blue Growth through an indicator framework (European MSP Platform, 2018).

Numerous EU-funded projects have been initiated to foster knowledge exchange and consistency among MSPs within sea basins. The European Maritime Fisheries and Aquaculture Fund (EMFAF), previously EMFF, has played a significant role in financing MSP cooperation projects in EU sea basins, promoting cross-border stakeholder contacts and consultations.

Moreover, MSP contributes significantly to the EU's Green Deal agenda by supporting the decarbonization of the energy system, essential for achieving the EU's climate objectives. The EU recognizes MSP as an indispensable tool to facilitate and deploy offshore renewable energy in a sustainable manner. MSP's role in allocating maritime space for renewable energy production, promoting regional cooperation between Member States, and its contribution to multi-use of maritime space will be further elaborated in this section.

The role of MSP as a facilitator in achieving the objectives of the EU's Green Deal in the maritime domain is profound (Addamo, A.,et al., 2022). It plays a pivotal role in promoting fair distribution of benefits from marine resources, defining them, and organizing areas based on stakeholders' interests. Key stakeholders in MSP encompass fisheries communities, industrial sectors, NGOs, researchers, academia, neighbouring countries, and international organizations. The process of aligning these interests can be challenging, yet substantial progress has been made.

A good example for implementing and promoting effective MSP in the EU is EMODnet, the European Marine Observation and Data Network (European Commission). It plays a pivotal role as an EU focal point for MSP. It offers a comprehensive, integrated approach to managing and optimizing the use of our seas and oceans in a cohesive, efficient, safe, and sustainable manner.

EMODnet serves as a valuable tool for ensuring that human activities in the marine environment are well-coordinated, minimizing conflicts and maximizing the responsible utilization of marine resources. Since 2021, EMODnet has expanded its role to include providing access to national Maritime Spatial Plans, making it a central gateway for valuable planning information.

EMODnet's Human Activities sector works in close collaboration with Regional Sea Conventions, the European Commission Joint Research Centre (EC JRC), and the Technical Group (TG) on Data for MSP. Together, they are actively engaged in developing technical solutions to harmonize EU MSP efforts within the EMODnet framework.

On the regional scale, the EU BE report for 2022 highlighted eMSP (North Baltic Sea Regions) NBSR project, initiated by a collaboration of 15 partners across the North and Baltic Sea regions (Addamo, A.,et al., 2022). It was proposed to the European Commission at the end of 2020 and officially launched in September 2021. This project serves a vital purpose, it empowers MSP from managing authorities and policy makers in these regions to collectively reflect on existing MSP practices, facilitating effective mutual learning and collaborative problem-solving.

The primary objective of the eMSP NBSR project is to enhance the knowledge and expertise of national governments and the European Commission concerning the implementation, development, research, and management strategies needed to address the evolving challenges and opportunities in a coordinated manner. Encouraging participation from industry stakeholders, academia, and non-

governmental organizations, the project recognizes the importance of diverse perspectives.

Recognizing the need for a flexible and reflective platform to facilitate this, the NBSR project adopts the Community of Practice (CoP) model. The project's outcomes, including policy briefs, play a crucial role in helping stakeholders enhance the design, implementation, and monitoring of maritime spatial plans, utilizing the latest knowledge from science and innovation. The project's focus areas encompass ocean governance, an ecosystem-based approach, the promotion of a sustainable BE, monitoring and evaluation, and the effective use of data exchange and information technology to support MSP.

This example exemplifies how regional collaboration and knowledge-sharing initiatives in the realm of MSP can lead to improved planning, sustainable maritime development, and effective governance, aligning well with the broader objectives of MSP.

Moreover, on the local and regional level, Pulselli et al. described the development of a Blue Energy planning framework within the context of the Interreg Med BLUE DEAL project, which aims to promote the deployment of Blue Energy technologies in the Mediterranean region and integrate them into regional Energy Plans and Marine Spatial Planning initiatives (Pulselli et al., 2022). The methodology outlined in the paper applied in three case studies in Crete, Croatia, and Cyprus, where it was used to identify suitable areas for deploying blue energies, assess potential interventions, and evaluate their impacts. The paper provides a clearly defined sequence of stages for creating an integrated Blue Energy plan, considering local potentials, technological requirements, environmental and legal restrictions, and other maritime activities. It highlights the importance of stakeholder involvement, recommending the inclusion of various data sources, models, and tools to enhance the planning methodology.

MSP's role in fostering sustainable BE is paramount, but it requires consideration within a broader socio-economic, ecological, institutional, and political context. The process of MSP is complex and dynamic, requiring adaptability to diverse stakeholders and changing perspectives. It plays a key role in planning for the future, preventing conflicts, and promoting economic potential in maritime spaces. A clear vision and well-defined objectives are fundamental to MSP's success, offering stability and predictability for sectors and driving investment. Visions and MSP processes are not standalone exercises but continuous, adaptive efforts that require long-term commitment and monitoring. Effective communication of MSP benefits to sectors and the recognition of the maritime economy's diversity are central to success. Ultimately, MSP serves as a powerful tool for advancing the sustainable BE, although acknowledging its limitations is equally important. Establishing clear links between MSP and specific sectors is a challenge, yet it remains a critical component of sustainable oceanic planning. The enduring success of MSP hinges on cross-border cooperation and its ability to address transboundary impacts, including cooperation with third countries.

This concept of MSP, cantered on ecosystem-based planning, harmonizes well with the subsequent section. The ecosystem-based approach highlighted in MSP serves as the foundation for understanding the significance of marine ecosystems in supporting and enhancing the sustainability of the BE. The forthcoming section sheds light on marine ecosystems and their services in achieving a sustainable and harmonious BE and digs deeper into the economic valuation of these services.

2.5. Ecosystem Services in a Sustainable Blue Economy

Blue natural capital refers to the valuable resources found in the world's oceans, encompassing both non-living elements like water and oxygen, as well as living organisms. These assets provide a range of benefits to humans known as marine ecosystem services (Addamo, A.,et al., 2022).

Marine ecosystems are comprised of both living organisms and non-living components, collectively forming natural marine capital that plays a vital role in providing a range of ecosystem services essential for human well-being (Barbier, 2017; Buonocore et al., 2020). These services, which include food provision, coastal protection, water purification, carbon sequestration, and recreational opportunities, rely on the physical, chemical, and biological processes within marine ecosystems. Biodiversity is particularly important in maintaining ecosystem functions and overall ecosystem health, which, in turn, contribute to the generation of services benefiting society and the economy (Daam et al., 2019). The most widely acknowledged framework for linking ecosystems and human wellbeing is the ecosystem service cascade model which illustrates the interconnectedness between ecosystems and human well-being by depicting the flow of services from ecosystem processes to societal benefits (Potschin-Young et al., 2018).

Marine ecosystems face unprecedented changes caused by various human pressures, such as overfishing, pollution, habitat destruction, and climate change (Ani & Robson, 2021; Küpper & Kamenos, 2018; Worm et al., 2006). These drivers of change often act synergistically and result in the loss of marine biodiversity. Despite the growing recognition of the value of coastal and marine ecosystem services, the assessment and mapping of these services still lag behind compared to terrestrial ecosystems (Milon & Alvarez, 2019). Nonetheless, scientific research on marine ecosystem services has been rapidly increasing, with recent focus on interdisciplinary research to understand the ecological and socioeconomic dimensions of sustainability. The concept of ecosystem services has also gained significant attention in international policies related to marine conservation and sustainable development.

The definition and classification of marine ecosystem services have been addressed by several initiatives and frameworks, including the Millennium Ecosystem Assessment (MA), The Economics of Ecosystem Services and Biodiversity (TEEB), the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES), and the Common International Classification of Ecosystem Services (CICES). These initiatives provide various definitions and categorizations of ecosystem services, emphasizing the benefits derived from coastal and marine ecosystems.

The loss of marine ecosystem services is a significant concern due to the degradation and unsustainable use of coastal and marine ecosystems (Barbier, 2017). Biodiversity loss in marine environments has detrimental effects on the capacity of these ecosystems to provide services to humans, and the trend of biodiversity decline is accelerating globally (Johnson et al., 2017). Coastal habitats, such as coral reefs, mangroves, and seagrass beds, have experienced significant reductions in both their coverage and biodiversity, which has had adverse effects on inshore fisheries and their capacity for carbon sequestration (Bradly & Moorhouse, 2011). Anthropogenic drivers, both direct and indirect, contribute to these changes, including overfishing, invasive species, pollution, and climate change. Overfishing and destructive fishing practices disrupt marine ecosystems and deplete fish stocks, while invasive species can cause ecological, economic, and health impacts. Marine pollution, including plastic pollution, poses a complex threat to marine biodiversity and can harm the marine food web.

The conservation and sustainable management of marine ecosystem services hold profound implications for community-based development. Marine ecosystem services play a crucial role in community-based development in several interconnected ways. Firstly, recognizing community dependencies on marine ecosystems is vital. Understanding how local communities depend on and interact with these ecosystems is essential for community-based development. It highlights the importance of sustaining ecosystem services for the well-being and livelihoods of community members, emphasizing that community prosperity and development are closely linked to the health and sustainability of marine ecosystems.

Secondly, integrating local knowledge and priorities is a key aspect of community-based development. By recognizing and valuing ecosystem services, it becomes possible to incorporate local knowledge and perspectives into the assessment and management of marine ecosystems. This engagement with communities and their reliance on specific ecosystem services allows development initiatives to be tailored to meet their needs and aspirations while ensuring the sustainable use of marine resources.

Thirdly, valuing ecosystem services helps identify economic opportunities and livelihood options derived from sustainable use and conservation of marine resources. By understanding the economic potential of marine ecosystems, community-based development initiatives can identify sustainable livelihood options such as eco-tourism, sustainable fisheries, or aquaculture projects. This approach enables communities to explore and capitalize on the economic benefits of their marine ecosystems while aligning with their cultural values and ensuring long-term sustainability.

Fourthly, participatory approaches are encouraged in community-based development. Assessing ecosystem services provides a platform for involving local communities in the valuation process itself, allowing them to contribute their knowledge, observations, and perspectives. This participatory approach fosters a sense of ownership and empowerment within the community, increasing their commitment to sustainable practices and the long-term stewardship of marine ecosystems.

Lastly, the recognition of marine ecosystem services facilitates partnerships and collaboration between community-based development initiatives, local communities, NGOs, government agencies, and other stakeholders. Different actors can come together to pool resources, share expertise, and work collectively towards sustainable development goals that benefit both the community and the environment.

Addressing the drivers of change and implementing sustainable management practices are crucial for conserving and restoring marine ecosystem services. This requires interdisciplinary research, effective governance, and international collaboration to ensure the long-term sustainability of blue natural capital and the benefits it provides to society.

2.5.1. The economic valuation of Marine Ecosystem services

Understanding the economic value of marine and coastal ecosystems is crucial for assessing their contribution to human well-being and addressing knowledge and governance deficits (Coopman et al., 2019). Over the past few years, research on blue natural capital and marine and coastal ecosystem services has made significant progress in terms of mapping, quantification, valuation, and impact assessment (Liquete et al., 2013). However, there are still gaps in knowledge and application (Barbier, 2012). This is evident from concerning data on marine pollution and biodiversity loss in European seas and beyond (Boillat & Ifejika Speranza, 2019; Hall-

Spencer & Firth, 2021), as well as cases of mismanagement, environmental justice, and liability in marine ecosystems (Zhongming et al., 2021).

BE should be viewed as a complex system where anthropogenic economic activities interact with marine ecosystems and biodiversity (Addamo, A.,et al., 2022). However, the measurement of the benefits, dependencies, and impacts of economic activities on the marine environment is often isolated or incomplete (Spangenberg & Settele, 2010). Despite an increasing number of studies on marine ecosystem services, assessments often focus on only a limited number of services, particularly those related to commercial exploitation or coastal protection. As a result, BE statistics tend to be incomplete and not easily comparable with data from other sectors of the economy (Jolliffe et al., 2021).

Recognizing that marine ecosystem services are underutilized in decision-making processes, the European Marine Board recommends the systematic inclusion of ecosystem valuation in marine management decision models (Austen et al., 2019). They also advocate for the harmonization of ecosystem service frameworks to enhance comparability of results. Additionally, the wider dissemination of data and indicators on the monetary and non-monetary values, costs, and trade-offs of marine ecosystems is expected to improve their usability (Coopman et al., 2019).

The economic valuation and assessment of marine ecosystem services are crucial for conveying the significance of natural resources to policymakers and managers, as well as supporting the implementation of sustainable strategies for marine natural capital (Buonocore, Buia, et al., 2021). However, assessing and mapping marine ecosystems and their services present unique challenges compared to terrestrial ecosystems (Townsend et al., 2018). The dynamics, complexity, and high connectivity among marine habitats, along with widespread ecological processes and species dispersal, make the assessment of ecosystem services demanding, time-consuming, and resource-intensive (Manea et al., 2019). Despite these challenges, there has been a growing research effort in recent decades to assess the value of services generated by marine ecosystems and integrate these values into marine planning and decision-making processes (Milon & Alvarez, 2019).

Several countries are taking action to address this issue by incorporating sea satellite accounts (e.g. The Portuguese observatory for the blue economy and the ocean satellite account) and ocean ecosystem accounts into their systems of national accounts. These initiatives serve as experimental or integrated components aimed at better understanding the economic-environmental linkages and facilitating comparisons of BE statistics across countries and regions. Additionally, the Organization for Economic Co-operation and Development (OECD) has developed a blueprint framework to enhance the measurement of the international ocean economy, thereby supporting sustainability assessments (Jolliffe et al., 2021).

In the EU, significant progress has been made in mapping terrestrial, freshwater, and marine ecosystems and their services through the Mapping and Assessment of Ecosystems and their Services (MAES) initiative. The initial assessment reveals that marine ecosystems cover a vast area of 5.8 million km^2, surpassing land ecosystems at 4.4 million km^2 (Addamo, A.,et al., 2022). However, ecosystems under specific protection measures are experiencing unfavourable conditions, including increased acidification. Despite efforts to maintain fish stocks at sustainable levels, overfishing activities and marine pollution continue to exert pressures, leading to the degradation and loss of marine biodiversity and habitats. Currently, more than 70% of marine

habitats have an unfavourable conservation status (J. R. C. European Commission, 2020).

Assessments of marine ecosystem services can be performed using biophysical, sociocultural, and economic methods, which complement each other and provide diverse indicators to support decision-makers (Harrison et al., 2018). Biophysical methods involve direct measurement, indirect measurement, and modelling techniques to quantify parameters related to the provision of ecosystem services (Vihervaara et al., 2018). Sociocultural methods highlight the values that individuals and societies attach to nature, considering both instrumental and intrinsic motivations (Walz et al., 2019). Economic methods, on the other hand, assess marine ecosystem services in monetary units, encompassing direct, indirect, and non-use contributions (Obst et al., 2016). Monetary valuations can be instrumental in evaluating the impacts of policies or management actions affecting marine ecosystems within benefit-cost analyses.

Standard frameworks and accounting systems have been developed to facilitate the assessment and integration of ecosystem services into economic evaluations. The System of Environmental-Economic Accounting 2012 or SEEA Central Framework provides an international standard for environmental-economic accounting, focusing on natural resource stocks and flows exchanged between the economy and the environment. The SEEA Experimental Ecosystem Accounting, published in 2014, offers a standardized set of terms, concepts, and accounting principles for ecosystem services assessment in both physical and monetary terms. However, while these frameworks have been extensively applied to terrestrial ecosystems, there is a need for further research and application in the context of coastal and marine ecosystems (Torres & Hanley, 2017; Townsend et al., 2018).

Global estimates of marine ecosystem services highlight their substantial economic value, with estimates of 49.7 trillion USD per year (Buonocore, Grande, et al., 2021). These valuations emphasize the importance of understanding and effectively managing marine ecosystems to conserve their biodiversity, maintain valuable functions and services, and promote sustainable socioeconomic activities.

In conclusion, the assessment and valuation of marine ecosystem services play a vital role in promoting the sustainable use and conservation of marine natural capital. The integration of ecosystem services into policy and decision-making processes is crucial for achieving a harmonious balance between human activities and the preservation of healthy and diverse marine ecosystems.

2.6. The Mediterranean area

Throughout history, the Mediterranean Sea has played a crucial role in the economies of coastal communities and nations. Today, more than ever, BE sectors are a significant driver of the region's economy, offering immense potential for innovation and sustainable, inclusive prosperity. However, the economic opportunities presented by the Mediterranean Sea come with an increasingly urgent need for responsible ecosystem management to preserve and enhance their long-term value. This involves transforming sectors like fisheries and coastal tourism to be more sustainable, as well as fostering the development of clean, technologically advanced activities like renewable energy, which can bring about innovation and employment opportunities for all Mediterranean countries. Achieving the shared goal of sustainably using and conserving our most valuable common resource, the Mediterranean Sea, requires close collaboration among all Mediterranean nations and their stakeholders.

In the Mediterranean region, various international organizations, including UN Environment through its Mediterranean Action Plan (UNEP/MAP), the Union for the Mediterranean (UfM), and the EU are collaborating to align their strategies for a sustainable BE. These efforts are in line with the Mid-term strategy of the General Fisheries Commission for the Mediterranean (GFCM), the EU's long-term Blue Growth strategy (which encompasses the EU's Strategy for the Adriatic and Ionian Region), and the Mediterranean Strategy for Sustainable Development 2016-25 (MSSD) (UNEP/MAP, 2016). The MSSD was collectively adopted by all the Contracting Parties of the Barcelona Convention, a regional sea program established in 1995, which now includes 22 Contracting Parties. The primary goal of the Barcelona Convention is to safeguard the Mediterranean marine and coastal environment while promoting sustainable development at both regional and national levels.

The Mediterranean Strategy for Sustainable Development 2016-25 serves as a strategic policy framework that enables all stakeholders and partners to align the 2030 Sustainable Development Agenda with regional, subregional, and national levels. This framework aims to ensure a sustainable future for the Mediterranean region in line with SDGs. The MSSD is grounded in the principle that socio-economic development must be harmonized with environmental protection and the preservation of natural resources. It focuses on addressing key areas of the marine and coastal environments that are affected by human activities, using an ecosystem-based approach and planning tools like Integrated Coastal Zone Management (ICZM).

Another effective program is Interreg Euro-MED Programme (Interreg Euro-MED). A notable feature of this impactful program is its emphasis on the regional level. This initiative stands out for its effective approach, operating across diverse regions within the Mediterranean. The program extended after its first period from 2014 to 2020. For the new period from 2021 to 2027, the total budget amounts to about 294M€ (Interreg Euro-MED Programme Summary, 2022).

The programme stands out for its robust regional focus, operating across 69 regions in 14 countries, including 10 EU Member States and four countries from the Instrument for Pre-Accession Assistance (IPA) (Programme Interreg Euro-MED). Covering approximately 25% of the European Union along with the four IPA nations, this initiative represents an expansive collaboration, benefitting more than 140 million people. By concentrating on the regional level, the program strategically addresses the distinctive needs and opportunities within this diverse and interconnected landscape. This approach enhances the program's effectiveness in promoting a climate-neutral and resilient society, aligning with the common objective shared by partners throughout the Mediterranean region.

Within the previous phase of the Interreg MED Programme, BLUE DEAL surfaced as a noteworthy European initiative co-funded by the European Regional Development Fund under the thematic section of "Blue Growth" within the INTERREG-MED programme (BLUE DEAL, 2022). Focused on overcoming technical and administrative barriers in the diffusion of Blue Energy, BLUE DEAL aims to establish requirements and procedures that align with regulatory, environmental, and social considerations. It strives to identify best practices for planning, testing, and integrating Blue Energy procedures in Mediterranean regions while formulating a common strategy for technology portability in the area. Building upon the outcomes of the Interreg MED MAESTRALE and PELAGOS projects, BLUE DEAL envisions local and transnational workshops to engage stakeholders, execute participatory planning processes, and foster collaborations between the public and private sectors. With a budget of 2.8

million euros and a 32-month timeline, BLUE DEAL integrates 13 partners from 7 countries and 9 different regions of the Mediterranean, showcasing a concerted effort within the INTERREG-MED framework to advance sustainable Blue Growth in the region.

Highlighting programs and initiatives within the regional and local context is pivotal as they signify a concerted effort to address challenges and harness opportunities specific to those areas. Projects tailored to the regional and local levels play a crucial role in fostering collaboration and engagement with local communities. It is essential to tailor initiatives to the unique needs of these regions, which can better navigate local intricacies, ensuring a more effective and sustainable impact. Encouraging such endeavours bolsters regional development and facilitates stronger partnerships between project stakeholders and local communities. This approach fosters a sense of ownership, participation, and shared responsibility, essential elements for the success and longevity of projects aimed at regional and local levels. Ultimately, encouraging and supporting these initiatives contributes to a more inclusive and community-driven approach to sustainable development.

In the subsequent section, the focus will centre on Italy's unique position and its consequential impact on BE operating within the Mediterranean region. It delve sinto Italy's multifaceted contributions, analysing its role in various sectors.

2.6.1. Italian Blue Economy

Using BE as a framework can advance many of the SDGs (Voyer et al., 2018b). Some coastal regions, however, do not have a clear or consistent understanding of how to govern their BE. There could be different aspects of this uncertainty. Moreover, there are many different ways in which BE (and associated terms such as Blue Growth and sustainable ocean economy) can be conceptualized and described in different ways (Smith-Godfrey, 2016b). These inconsistencies pose both a challenge and an opportunity for actors interested in participating in BE, as they create both conflict and flexibility (Choi, 2017; Mallin & Barbesgaard, 2020; Schutter et al., 2021; Winder & Le Heron, 2017). International guidelines are crucial in order to pursue a coherent BE approach. In addition, an approach for developing regional strategies or guidelines should be considered. There is a need for integrated and coordinated policy packages to be implemented at national, regional, and local levels. These packages should also be adapted to the specific needs of different regions of the country (McCann & Soete, 2020).

In terms of BE, Italy is a country with a strong maritime specialization. A strategic position within the Mediterranean basin and 7500 kilometres of coastline makes the country deeply connected to the sea (see graph 4). Italy generated $145 billion in 2021 from BE, representing 10% of the Italian GDP, with more than 225,000 companies employing over 900,000 workers (Calabria, 2022).

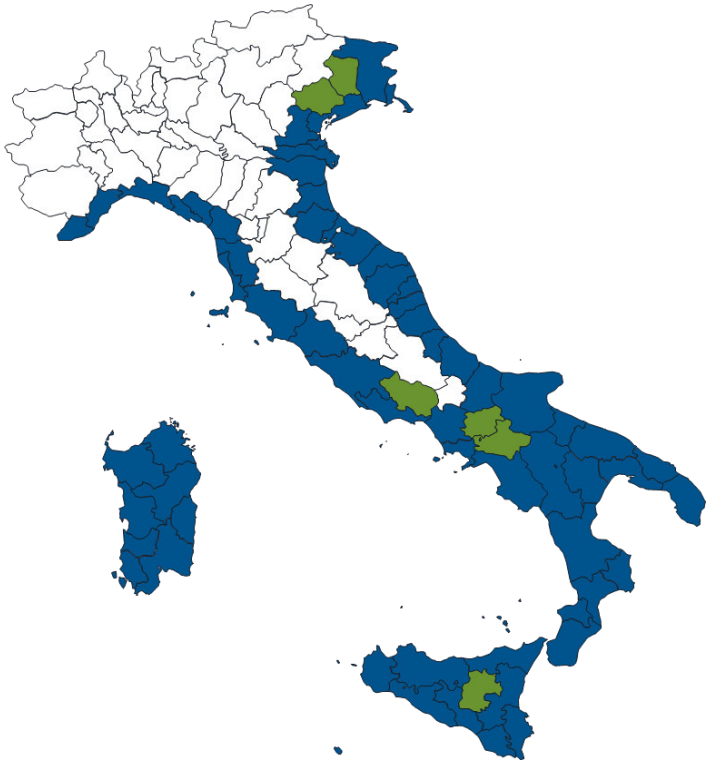


Fig. 4. The Italian provinces classified according to the criterion of coastal regions (in blue the provinces with a border on the sea and in green those that have at least 50% of the population within 50 km of the coastline)..

Source: Elaborated by the Guglielmo Tagliacarne Chambers of Commerce Study Center on Eurostat data.

Italy is among the 4 largest blue economies in Europe (InforMare, 2022). The contribution to the EU BE varies significantly between member states with Spain, Germany, Italy, and France as the four largest blue economies in Europe (see chart 5), both in terms of employment (52.7% combined) and gross value added (61.5% combined) (InforMare, 2022). According to the Italian national report on the economy of the sea for 2022, the highest contributors are Spain (18.8%) and Germany (16.8%). The Italian BE contributed 13.5% to the EU BE in 2018, followed by France (12.4%). According to the labor market, Italy has 11.8% of the "blue jobs", placing it fourth in Europe after Spain (20.7%), Greece (12.8%), and Germany (11.9%).

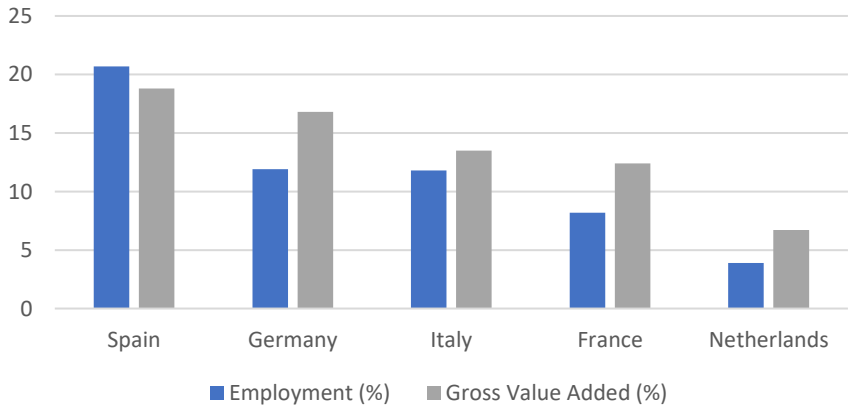


Fig.5. Contribution to EU Blue Economy (2018)

The Italian BE occupies an important position at the European level in the formation of added value. A total of 16% of the EU added value in maritime transport is produced by Italy, which comes after Germany (37%). With 19% of total value added from marine non-living resources (oil, gas, and other minerals extracted from the seas), Italy ranks third (after Denmark 39%, and the Netherlands 37%). Again, 19% of the added value was produced in the shipbuilding and repairs sector (coming after Germany with 23%, and France with 21%). Furthermore, it contributes with 13% from coastal tourism which comes in the third place after the other two leading countries - Spain (30%) and France (14%). Finally, Italy generates 14% of the added value in marine living resources, fourth after Spain (19%), Germany (16%), and France (15%), and 8% in port activities, fifth place after Germany (21%), the Netherlands (16%), Spain (13%), and France (12%) (see table 2). Even though Italy has remained one of the top four BE countries in Europe, its weight has decreased slightly from 2009 to 2018, both in terms of its gross value added (from 13.9% to 13.5%) and employment (from 13.7% to 11.8%) (InforMare, 2022).

Table 2. Italy's Contribution to EU Added Value (Maritime Sectors, 2018)

Sector	Italy	Rank in the EU
Maritime Transport	16	2nd place
Marine Non-living Resources	19	3rd place
Shipbuilding and Repairs	19	3rd place
Coastal Tourism	13	3rd place
Marine Living Resources	14	4th place
Port Activities	9	5th place

In terms of territorial value, north-south divisions are flipped with BE, which reverses territorial hierarchies. In fact, due to the peculiar geographical position of its regions, the south is the area that contributes most to the added value of the sea economy, followed by the centre. The south contributes to the BE value-added, with a total value of 15.6 billion euros (see figure 6), followed by the centre (13.7 billion euros), the northwest (13.3 billion), and the northeast (8.5 billion) (InforMare, 2022). The former develops 30.4% of the wealth produced by the maritime system and the latter 26.8%. Followed by the North-West (26.0%) and the North-East (16.7%) (InforMare, 2022).

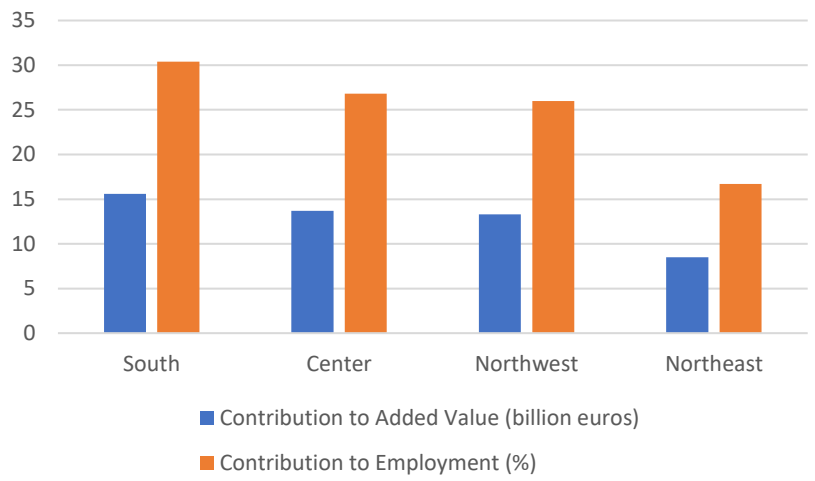


Fig. 6 Italy's Blue Economy for territories (InforMare, 2022)

Almost all southern regions, except for Molize (17th place), are ranked among the highest in terms of how much their sea economies contribute to the creation of added value. The first rank, however, goes to a Northern region - Liguria - with 14.5% of its total added value attributed to the BE, twice as much as Basilicata (6.6%) which comes second (see figure 7). The sector of transport of goods and passengers by sea is the major source of wealth in Liguria (55.4% of the regional added value is attributed to the BE), while in Basilicata the industry of marine extractions (66.8%) is the major contributor (InforMare, 2022). Third place goes to Friuli-Venezia Giulia (5.8%), but six of the next seven positions go to southern regions: Sardinia (5.2%), Calabria (5.0%), Lazio (4.8%), Campania (4.8%), Sicily (4.8%), Abruzzo (4.2%) and Puglia (4.1%).

Fig. 7. 2020 Regional Ranking: Maritime Economy's Impact on Value added Percentage

In terms of the percentage of BE employment in the regional level, Liguria ranks first with 11.9% (map 8). In this case, however, some regions of the centre make more room. Sardinia (6.6%) and Sicily (5.8%) are ranked second and third, respectively, followed by Lazio (5.5%), Campania (5.2%), and Marche (5.0%). Abruzzo (4.7%), Calabria (4.4%), and FriuliVenezia Giulia (4.9%) round out the top ten. Basilicata (2.2%) and Molise (1.8%) are the only southern regions that don't rank in the top ten (InforMare, 2022).

Fig. 8. 2020 Regional Ranking: Maritime Economy's Impact on Employment Percentage

Nevertheless, when analysing the data for the sea economy in absolute value, Rome stands out as the leading province (see figure 9), with 14.6% of the wealth produced in Italy by the BE (equal to 7.5 billion euros) and 14.4% of the employed (over 132 thousand). Genoa comes in second place, contributing 9.1% of added value and 8.5% of the workforce. However, when the wealth and employment generated by the sea economy are compared to the total of the provincial economy, Genoa comes out on top (figure 10). According to the added value index, Trieste, Gorizia, and La Spezia, all of which are located in northern Italy, are among the top four (with 15.7%, 13.3%, and 12.3%, respectively). It is always northern Italian provinces that dominate the employment rankings (InforMare, 2022).

Fig. 9. Top 5 Provinces by absolute value (in billions €)

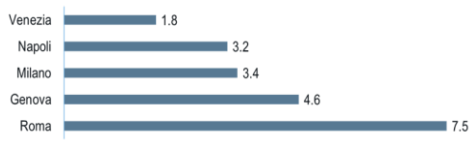
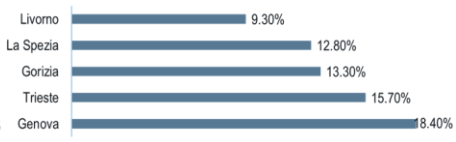


Fig. 10. Top 5 Provinces by % incidence on the total provincial economy



Liguria has the highest percentage of blue companies in the Italian economy, with a value of 10.3%. Second place goes to Sardinia with 7%. The following five regions exceed the 5% threshold: Sicily (5.8%), Lazio (5.7%), Marche (5.3%), Calabria (5.2%), and Campania (5.1%). It is estimated that 47.9% of the sea economy enterprises are located in the south (107,568 enterprises), 26.2% in the centre (58,755), 14.8% in the northeast, and 11.2% in the northwest.

Italy needs to tackle its governance issues and capitalize on its exceptional coastal regions by implementing comprehensive strategies, customized protocols, and global partnerships. These measures are crucial for promoting sustainable and inclusive development in BE. The upcoming section delves into Italy's national plan for recovery and resilience, which aims to overcome obstacles and propel the country's economy forward.

Blue Economy in PNRR

In July 2020, the European Union has responded to the pandemic crisis with Next Generation EU (NGEU) and its two main tools: the Recovery and Resilience Facility (RRF) and the Recovery Assistance Package for Cohesion and the Territories of Europe (REACT-EU). NGEU has put in place 750 billion euros in resources to boost growth, investment, and reforms, of which 390 billion euros are grants (*Recovery Plan for Europe*). REACT-EU was created for a short-term (2021-2022) outlook to help countries relaunch their economies. The RRF, on the other hand, is the most significant component of the programme. It has a duration of six years, from 2021 to the end of 2026. A total of 672.5 billion euros are allocated to it, of which 312.5 billion are grants and 360 billion are loans at subsidized rates. NGEU provides unprecedented investments and reforms to speed up technological and ecological transitions, improve the training of male and female workers, and ensure gender, territorial, and generational equity (*NextGenerationEU*).

NGEU is an important opportunity for Italy for development and investment. Modernizing the Italian public administration, strengthening the production system, and battling poverty, social exclusion, and inequalities are all crucial to reducing poverty, social exclusion, and inequalities within Italy. Hence, NGEU offers a chance to restore Italian economic growth by removing the obstacles that have slowed it down for decades. NGEU provides considerable resources to countries with low economic growth and high unemployment, such as Italy, which, despite its per capita income level being in line with the EU average, suffers from low economic growth. Italy is the first beneficiary, in absolute value, of the two main tools of the NGEU: RRF and REACT-EU (Italia Domani, 2020).

Hence, as a requirement of the RRF, Member States are required to present a plan of investments and reforms. According to the RRF Regulation, the national plans should focus on six major intervention areas (pillars): green transition; digital transformation; smart, sustainable, and inclusive growth; social and territorial cohesion; health and economic, social, and institutional resilience; and policies for the new generations, children, and young people (*Recovery and Resilience Facility*). The plans must also guarantee that no significant environmental damage will be caused by all investments and reforms included in them.

Italy submitted its plan, known as Piano Nazionale di Ripresa e Resilienza (PNRR), and was approved by the European council in 2021 (Alessandro, 2022). This Plan, which is divided into six Missions and 16 Components, benefits from the close dialogue that has taken place in recent months with the Parliament and the European Commission, on the basis of the RRF Regulation. PNRR provides 134 investments (235 if sub-investments are included), and 63 reforms for a total of 191.5 billion euros from the Next Generation EU fund. The plan allocates nearly 40 percent of resources to the South, reflecting the attention paid to territorial rebalancing.

PNRR will significantly contribute to reducing the generational, territorial, and gender gaps. According to the Plan, 82 billion euros will be allocated to the south out of a total of 206 billion euros (40%) that can be distributed geographically.

The PNRR is divided into 6 missions as follows:

1. **Digitisation, Innovation, Competitiveness, Culture, and Tourism** (€ 49.2 billion (of which € 40.7 billion from the Recovery and Resilience Facility and € 8.5 billion from the Complementary Fund)) with the aim of promoting the country's digital transformation, supporting innovation in the production system, and investing in two key sectors for Italy, namely tourism and culture.

2. **Green Revolution and Ecological Transition** (€ 68.6 billion (€ 59.3 billion from the RRF Facility and € 9.3 billion from the Fund)) with the main goals of improving the sustainability and resilience of the economic system and ensuring a fair and inclusive environmental transition.
3. **Infrastructure for Sustainable Mobility** (€ 31.4 billion (€ 25.1 billion from the RRF Facility and € 6.3 billion from the Fund)). Its primary objective is the development of a modern, sustainable transport infrastructure extended to all areas of the country.
4. **Education and Research** (€ 31.9 billion (€ 30.9 billion from the RRF Facility and € 1 billion from the Fund)) with the aim of strengthening the education system, digital and technical-scientific skills, research, and technology transfer.
5. **Inclusion and Cohesion** (€ 22.4 billion (of which € 19.8 billion from the RRF Facility and € 2.6 billion from the Fund)) to facilitate labour market participation, including through training, strengthening active labour market policies, and fostering social inclusion.
6. **Health** (€ 18.5 billion (€ 15.6 billion from the RRF Facility and € 2.9 billion from the Fund)) to strengthen local prevention and health services, modernise and digitising the health system, and ensure equal access to care.

PNRR emphasizes digital transformation, innovation, and competitiveness in the production system as a key component. It allocates significant funding for these purposes, particularly in promoting the digital transformation of Italian businesses, research, development, and innovation, with a focus on SMEs.

While the plan doesn't explicitly mention blue sectors, it highlights the importance of strengthening innovation rates, investing in cutting-edge technologies, and improving infrastructure, including transportation and electricity distribution.

In Mission 2, for example, there are several components aimed at achieving environmental sustainability, renewable energy, and protection of natural resources. Some of these interventions, like investments in renewable energy and protection of marine habitats, are directly related to blue sectors. While mission 3 concentrates on sustainable mobility infrastructure, with investments in the railway network and intermodality. These improvements are expected to boost economic development and create jobs, indirectly impacting blue sectors.

2.7. Community-based approach to managing the Blue resources in Italy

The sustainable management of blue resources has become a critical concern worldwide, as nations grapple with the challenges posed by the degradation and overexploitation of marine ecosystems. In Italy, a country blessed with a vast coastline and abundant marine biodiversity, the need for effective resource management strategies has never been more pressing. It is important to focus on the community-based approach to managing the blue resources, emphasizing the importance of engaging local communities as key stakeholders in conservation and sustainable utilization efforts.

The EMFAF operates from 2021 to 2027, supporting the EU's common fisheries policy (CFP), maritime policy, and agenda for international ocean governance (European Commission, 2021c). It also contributes to the objectives of the European Green Deal by promoting sustainable utilization of aquatic and maritime resources through the development of innovative projects (European Commission, 2021e). The EMFAF has a

total budget of €6.108 billion for the 2021-2027 period, with Italy's allocation amounting to €987.290.803.

To implement the EMFAF and the European Maritime and Fisheries Fund (EMFF), the Fisheries and Aquaculture Monitoring, Evaluation, and Local Support Network (FAMENET) is responsible. FAMENET consolidates the support provided by previous programs, namely the Fisheries Local Action Groups' Fisheries and Aquaculture Measures (FAME) and the European Fisheries Areas Network (FARNET). It monitors and evaluates the implementation of the EMFAF and the EMFF while promoting sustainable development of the BE through community-led local development (CLLD).

One successful story under FAMENET is the protection of the marine environment in Torre Guaceto, located in Puglia, southern Italy. In collaboration with local fishers, Torre Guaceto, a Marine Protected Area (MPA), has been safeguarded. This area boasts high species diversity and various habitats such as seagrass meadows, sandy beaches, and deep-sea coral formations. Cooperation with fishers was crucial in establishing fishing regulations for the MPA, which included criteria agreed upon by consortium members. These regulations restrict the types of fishing gear allowed, limit fishing frequency (once a week), designate no-take and nursery areas, and cap the number of fishers in the reserve (Consorzio di Gestione di Torre Guaceto). Despite the restrictions, fishers accept these rules because they recognize the higher catch they obtain within the reserve compared to fishing outside on any other day of the week. Regular involvement of fisheries in ecosystem services and weekly monitoring helps maintain awareness and respond promptly to changes in fish stocks.

Furthermore, three coastal fisheries local action groups have supported recent projects aiming to expand the Torre Guaceto MPA and enhance sustainable use of marine resources by local communities and fishers (Riserva di Torre Guaceto). In a June 2022 communication on international ocean governance, adherence to long-term conservation and sustainable use of marine resources and ecosystems was emphasized. The Torre Guaceto MPA exemplifies these principles while also boosting the competitiveness of local small-scale fisheries and benefiting coastal communities (SPA/RAC).

Another notable project in Italy is "Non Scarto ma Incarto" ("Don't discard, wrap it up!"). This project focuses on transforming unwanted catches into innovative products, such as food ingredients, feed components, cosmetics, and pharmaceuticals (Directorate-General for Maritime Affairs and Fisheries, 2022). The UNCI Alimentare NGO collaborated with the Academic Centre for Innovation and Development of the Food Industry (CAISIAL) at the University of Naples "Federico II" to identify the best product options and develop production processes for non-target and unwanted catches in the Campania region of Italy. These unwanted catches were utilized to produce valuable components like long-chain polyunsaturated fatty acids (EPA and DHA), fish paste, nutraceutical ingredients, fish sausages, meatballs, fish spreads, and ready-to-use fish sauce. Additionally, this project facilitated the collection of valuable bycatch data, promoting knowledge sharing between scientists and the fishing industry to reduce the environmental impact of fishing.

Coastal communities are empowered through the CLLD approach, which involves the development and implementation of local projects with the support of the EU. Local partnerships, consisting of private companies, local governments, and civil society organizations, are formed to design and execute integrated development plans. Funding for CLLD projects is delegated to these local partnerships. FARNET, operating across the EU, brings together FLAGs, managing authorities, citizens, and experts.

FLAGs are partnerships comprising fisheries actors and other stakeholders in a particular local area (European Commission). Their objective is to create and implement a local development strategy that addresses economic, social, and environmental needs. Each FLAG selects and finances projects that contribute to local development, engaging numerous stakeholders.

FLAGs in Italy play a crucial role in promoting sustainable development and supporting the fishing communities across the country. Italy has several FLAGs in different coastal areas, including regions like Sicily, Sardinia, and Campania (*The Community (FLAG) - EMFF*). There are 53 FLAGs spread across over 620 municipalities, with four in Calabria (See figure 11 for Calabria's FLAGs). These groups have been instrumental in implementing various initiatives, such as diversification of economic activities, capacity-building programs, and innovative projects to improve fishing practices and promote sustainable aquaculture. FLAGs in Calabria are the Pearl of the Tyrrhenian Sea FLAG (18 municipalities), the marine villages of Ionian Sea FLAG (14 municipalities), the Stretto FLAG (20 municipalities), and the Ionian 2 FLAG (45 municipalities).

In chapter 4, Calabrian's FLAGs' actions will be analysed and see to what extent they are aligned with the current BE sectors and objectives.

Fig. 11. FLAGs in Calabria.

Most of the areas included in these FLAGs are facing decline in the areas' fishing sector. These areas are largely dependent on small-scale and traditional fishing activities and processing. The majority of businesses in the area are small, family-owned businesses. A key challenge for the FLAG is a concerted effort to develop a more sustainable fisheries industry, one that can be diversified into other economic opportunities such as tourism and gastronomy. Table 3 shows each Calabrian FLAG's strategy and objectives.

Table 3. Strategies and Objectives of FLAGs in Calabria

FLAG	FLAG strategy	Objectives
Pearl of the Tyrrhenian sea FLAG (€ 1 205 190)	The strategy is based on the development of a more economically	• The development and promotion of a sustainable coastal tourism, one that is centred around gastronomic

	diverse and sustainable fisheries industry.	and pesca-tourism. Key to this objective is the diversification of small-scale fisheries into tourism activities. • To promote local products and to develop shorter supply chains. • To facilitate training and awareness-raising for fishers and processing employees. This will include enhancing the employment opportunities of young adults through innovative business support systems. • To promote the better use of the area's natural landscape and resources. This will include the development and organisation of cultural, recreational and sporting events and festivals.
Stretto FLAG (€1 501 892)	It aims to support the fishermen's communities and those involved in coastal development. It intends to promote a holistic vision for the area built by participative processes. Involvement of technical skills provided by urbanists, architects, anthropologists, agronomists, economists and biologists, together with traditional knowledge of the local community will ensure a sustainable and long-term development of the area.	• Support training. • Dissemination of knowledge and innovative practices. • Diversification of activities. • Improvement of safety, hygiene and health. • Creation of new spaces and facilities for the local community. • Building a network for scientific and fisheries experts. • Improvement of tourism services related to fishing.
Ionian 2 FLAG (€1 167 153)	The strategy's main objective is to strengthen the fisheries activities and boost the importance of the sector.	• Qualifying the productive system and the local market through the introduction of innovative tools and methods, and the creation of networks and supply chains. • Strengthening the links between tourism and fishing and coastal services. • Preserving cultural and environmental values.

The Marine Villages of Ionian Sea Flag (€1 481 072)	The strategy aims to enhance local development by promoting a local identity, to diversify the local economy and to improve the quality of life.	• The development and diversification of local fisheries businesses. • Supporting sustainable tourism linked to fisheries, while maintaining the protection and promotion of local, cultural and natural heritage. • Increasing opportunities for cross-sectoral projects, fostering cooperation among the various categories of local stakeholders.

In conclusion, the current changes occurring in the Earth system are unprecedented, driven by the rapid growth of the global population and the conflicting demands of economic growth and environmental protection. These changes have put immense pressure on water resources, energy consumption, agricultural lands, and overall ecosystem health. As human impact on the Earth accelerates, the need for sustainable development becomes paramount. The Sustainable Development Goals and the Paris Agreement serve as important frameworks to protect our planet, alleviate poverty, and address the challenges of climate change. Within this context, a sustainable ocean economy emerges as a crucial component for achieving multiple goals, including climate mitigation, job creation, food security, biodiversity conservation, and resilience. Oceans, as the Earth's largest natural carbon sink, play a vital role in regulating global warming, but they are also facing threats such as acidification, warming, and ecosystem degradation. Managing the oceans requires a focus on resilience and long-term, integrated approaches that consider multiple sectors and spatial scales. The concept of a sustainable BE has gained prominence as a framework for sustainable ocean management, promoting the optimal use of ocean resources across various industries and ecosystem services. The European Union has taken steps to support BE through initiatives like the European Maritime Fisheries and Aquaculture Fund, which aims to unleash the growth potential of a sustainable BE and contribute to the goals of the European Green Deal and the Sustainable Development Agenda.

Sustainable practices, including responsible fishing, reduced pollution, and the protection of marine habitats, are essential to maintain the delicate balance of marine ecosystems. Furthermore, investing in coastal communities is equally crucial. These communities often rely on the oceans for their livelihoods, and supporting them through infrastructure development, education, and job creation can lead to increased economic stability and opportunities. When coastal communities thrive, they are more likely to engage in responsible and sustainable practices, further contributing to the overall health of our oceans.

Preserving the health and resilience of the oceans is not just about environmental conservation; it is also a matter of economic and social well-being. As the planet faces the challenges of climate change, overfishing, and pollution, it is imperative to recognize the interconnectedness of these issues and take proactive steps to safeguard our oceans. In doing so, it is feasible to pave the way for a more sustainable and prosperous future for present and future generations.

References

Aburto, M. O., de los Angeles Carvajal, M., Barr, B., Barbier, E. B., Boesch, D. F., Boyd, J., Crowder, L. B., Cudney-Bueno, R., Essington, T., & Ezcurra, E. (2012). Ecosystem-based management for the oceans. Island Press.

Addamo, A.,et al. (2022). The EU blue economy report 2022. European Commission, Directorate-General for Maritime Affairs and Fisheries, Joint Research Centre.

Alessandro, D. (2022). Italy's National Recovery and Resilience Plan. https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698847/EPRS_BRI(2021)698847_EN.pdf

Andriamahefazafy, M., Bailey, M., Sinan, H., & Kull, C. A. (2020). The paradox of sustainable tuna fisheries in the Western Indian Ocean: Between visions of blue economy and realities of accumulation. Sustainability Science, 15(1), 75–89. https://doi.org/10.1007/s11625-019-00751-3

Ani, C. J., & Robson, B. (2021). Responses of marine ecosystems to climate change impacts and their treatment in biogeochemical ecosystem models. Marine Pollution Bulletin, 166, 112223.

Austen, M., Andersen, P., Armstrong, C., Döring, R., Hynes, S., Levrel, H., Oinonen, S., Ressurreição, A., & Coopman, J. (2019). Valuing Marine Ecosystems—Taking into account the value of ecosystem benefits in the Blue Economy [Preprint]. MarXiv. https://doi.org/10.31230/osf.io/vy3kp

Barbesgaard, M. (2018). Blue growth: Savior or ocean grabbing? The Journal of Peasant Studies, 45(1), 130–149.

Barbier, E. B. (2012). Progress and Challenges in Valuing Coastal and Marine Ecosystem Services. Review of Environmental Economics and Policy, 6(1), 1–19. https://doi.org/10.1093/reep/rer017

Barbier, E. B. (2017). Marine ecosystem services. Current Biology, 27(11), R507–R510.

Berkes, F., Colding, J., & Folke, C. (2008). Navigating social-ecological systems: Building resilience for complexity and change. Cambridge University Press.

BLUE DEAL. (2022). Interreg Med Project Official Website. https://blue-deal.interreg-med.eu/

Boillat, S., & Ifejika Speranza, C. (2019). IPBES Global Assessment Report on Biodiversity and Ecosystem Services. Chapter 3. Assessing progress towards meeting major international objectives related to nature and nature's contributions to people.

Bradly, N., & Moorhouse, C. (2011). A blueprint for ocean and coastal sustainability. Paris. Report No.

Brundtland, G. H. (1987). Our common future—Call for action. Environmental Conservation, 14(4), 291–294.

Buonocore, E., Buia, M. C., Russo, G. F., & Franzese, P. P. (2021). Exploring the convergence of natural flows for the generation of natural capital stocks in marine ecosystems. Ecological Complexity, 46, 100928.

Buonocore, E., Donnarumma, L., Appolloni, L., Miccio, A., Russo, G. F., & Franzese, P. P. (2020). Marine natural capital and ecosystem services: An environmental accounting model. Ecological Modelling, 424, 109029.

Buonocore, E., Grande, U., Franzese, P. P., & Russo, G. F. (2021). Trends and evolution in the concept of marine ecosystem services: An overview. Water, 13(15), 2060.

Burgess, M. G., Clemence, M., McDermott, G. R., Costello, C., & Gaines, S. D. (2018a). Five rules for pragmatic blue growth. Marine Policy, 87, 331–339.

Burgess, M. G., Clemence, M., McDermott, G. R., Costello, C., & Gaines, S. D. (2018b). Five rules for pragmatic blue growth. Marine Policy, 87, 331–339.

Calabria, M. (2022). Italy Blue Economy. https://www.trade.gov/market-intelligence/italy-blue-economy

Carver, R. (2020). Lessons for blue degrowth from Namibia's emerging blue economy. Sustainability Science, 15(1), 131–143. https://doi.org/10.1007/s11625-019-00754-0

CBD. (1992). Convention Text. Secretariat of the Convention on Biological Diversity. https://www.cbd.int/convention/articles/?a=cbd-00

Choi, Y. R. (2017). The Blue Economy as governmentality and the making of new spatial rationalities. Dialogues in Human Geography, 7(1), 37–41.

Cisneros-Montemayor, A. M., Moreno-Báez, M., Reygondeau, G., Cheung, W. W., Crosman, K. M., González-Espinosa, P. C., Lam, V. W., Oyinlola, M. A., Singh, G. G., & Swartz, W. (2021). Enabling conditions for an equitable and sustainable blue economy. Nature, 591(7850), 396–401.

Clark, W. C., & Harley, A. G. (2020). Sustainability science: Toward a synthesis. Annual Review of Environment and Resources, 45(1), 331–386.

Consorzio di Gestione di Torre Guaceto. (n.d.). The sustainable fishermen community in Marine Protected Area of Torre Guaceto. EUROPARC Federation. Retrieved 4 October 2023, from https://www.europarc.org/case-studies/sustainable-fishermen-community-marine-protected-area-torre-guaceto/

Coopman, J., Heymans, J. J., Kellett, P., Muñiz Piniella, A., French, V., Alexander, B., Austen, M. C., Andersen, P., Armstrong, C., & Döring, R. (2019). Valuing marine ecosystems: Taking into account the value of ecosystem benefits in the Blue Economy. Marine Board Future Science Brief.

Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'neill, R. V., & Paruelo, J. (1997). The value of the world's ecosystem services and natural capital. Nature, 387(6630), 253–260.

Daam, M. A., Teixeira, H., Lillebø, A. I., & Nogueira, A. J. (2019). Establishing causal links between aquatic biodiversity and ecosystem functioning: Status and research needs. Science of the Total Environment, 656, 1145–1156.

dell'Ambiente, M. (2017). Verso un modello di economia circolare per l'Italia. Documento Di Inquadramento e Di Posizionamento Strategico.

Directorate-General for Maritime Affairs and Fisheries. (2022, April 29). Non Scarto ma Incarto ("Don't discard, wrap it up!") or how EU helps to make a treasure out of trash. https://oceans-and-fisheries.ec.europa.eu/news/non-scarto-ma-incarto-dont-discard-wrap-it-or-how-eu-helps-make-treasure-out-trash-2022-04-29_en

Ecorys, D., & Développement, O. (2012). Blue Growth, Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts. European Commission, DG MARE, Rotterdam/Brussels.

Eikeset, A. M., Mazzarella, A. B., Davíðsdóttir, B., Klinger, D. H., Levin, S. A., Rovenskaya, E., & Stenseth, N. C. (2018a). What is blue growth? The semantics of "Sustainable Development" of marine environments. Marine Policy, 87, 177–179.

Eikeset, A. M., Mazzarella, A. B., Davíðsdóttir, B., Klinger, D. H., Levin, S. A., Rovenskaya, E., & Stenseth, N. C. (2018b). What is blue growth? The semantics of "Sustainable Development" of marine environments. Marine Policy, 87, 177–179.

European Commission. (n.d.-a). European Marine Observation and Data Network (EMODnet). Retrieved 2 November 2023, from https://emodnet.ec.europa.eu/en

European Commission. (n.d.-b). Map of the Week – Fisheries Local Action Groups (FLAGs). Retrieved 4 October 2023, from https://maritime-forum.ec.europa.eu/contents/map-week-fisheries-local-action-groups-flags_en

European Commission. (2018). REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. EUROPIAN COMMISION, Brussels.

European Commission. (2019). Orientations towards the first Strategic Plan for Horizon Europe.

European Commission. (2020). An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0741&from=EN

European Commission. (2021a). Oceans and fisheries. https://oceans-and-fisheries.ec.europa.eu/index_en

European Commission. (2021b, July 14). A European Green Deal. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

European Commission, D.-G. for M. A. and F. (2021). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on a

new approach for a sustainable blue economy in the EU Transforming the EU's Blue Economy for a Sustainable Future. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0240&from=EN

European Commission, J. R. C. (2020). Mapping and assessment of ecosystems and their services: An EU wide ecosystem assessment in support of the EU biodiversity strategy. Publications Office Luxembourg.

European Commission Oceans and Fisheries platform. (n.d.). Sustainable blue economy. Retrieved 10 November 2023, from https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/sustainable-blue-economy_en

European MSP Platform. (2018). Maritime Spatial Planning (MSP) for blue growth: Final technical study. Publications Office. https://data.europa.eu/doi/10.2826/04538

European MSP Platform, & European Commission. (n.d.). MSP for Blue Growth. Retrieved 3 November 2023, from https://maritime-spatial-planning.ec.europa.eu/faq/msp-blue-growth

European Parliament. (2021). Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund and amending Regulation (EU) 2017/1004. https://eur-lex.europa.eu/eli/reg/2021/1139/oj

FEAMPA. (2021). OP FEAMPA 2021-2027. https://www.pofeampa2021-2027.eu/

FEAP, F. of E. A. P. (2020). FEAP Position Paper on making grants available in the EMFF 2021-2027 for productive aquaculture investments.

Foley, M. M., Halpern, B. S., Micheli, F., Armsby, M. H., Caldwell, M. R., Crain, C. M., Prahler, E., Rohr, N., Sivas, D., & Beck, M. W. (2010). Guiding ecological principles for marine spatial planning. Marine Policy, 34(5), 955–966.

Ford, S. E. (1996). Range extension by the oyster parasite Perkinsus marinus into the northeastern United States: Response to climate change? Oceanographic Literature Review, 12(43), 1265.

Friedman, W. R., Halpern, B. S., McLeod, E., Beck, M. W., Duarte, C. M., Kappel, C. V., Levine, A., Sluka, R. D., Adler, S., & O'Hara, C. C. (2020). Research priorities for achieving healthy marine ecosystems and human communities in a changing climate. Frontiers in Marine Science, 7, 5.

Gattuso, J.-P., Magnan, A. K., Bopp, L., Cheung, W. W., Duarte, C. M., Hinkel, J., Mcleod, E., Micheli, F., Oschlies, A., & Williamson, P. (2018). Ocean solutions to address climate change and its effects on marine ecosystems. Frontiers in Marine Science, 5, 337.

Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P., Steffen, W., Glaser, G., Kanie, N., & Noble, I. (2013). Sustainable development goals for people and planet. Nature, 495(7441), 305–307.

Guerry, A. D. (2005). Icarus and Daedalus: Conceptual and tactical lessons for marine ecosystem-based management. Frontiers in Ecology and the Environment, 3(4), 202–211.

Hall-Spencer, J., & Firth, L. (2021). The Second World Ocean Assessment Volume 1.

Halpern, B. S., Selkoe, K. A., Micheli, F., & Kappel, C. V. (2007). Evaluating and ranking the vulnerability of global marine ecosystems to anthropogenic threats. Conservation Biology, 21(5), 1301–1315.

Harrison, P. A., Dunford, R., Barton, D. N., Kelemen, E., Martín-López, B., Norton, L., Termansen, M., Saarikoski, H., Hendriks, K., & Gómez-Baggethun, E. (2018). Selecting methods for ecosystem service assessment: A decision tree approach. Ecosystem Services, 29, 481–498.

InforMare. (2022). X RAPPORTO SULL' ECONOMIA DEL MARE 2022. InforMare Azienda Speciale Internazionalizzazione Formazione ed Economia del Mare Camera di Commercio Frosinone Latina. https://www.informare.camcom.it/x-rapporto-sull-economia-del-mare-2022/

Interreg Euro-MED. (n.d.). Who we are. Programme Interreg Euro-MED. Retrieved 11 November 2023, from https://interreg-euro-med.eu/en/who-we-are/

Interreg Euro-MED Programme Summary. (2022). Interreg Euro-MED Programme Summary. https://interreg-euro-med.eu/wp-content/uploads/documents/published/en/programme-documents/programme-documents/communication/Programme_Summary.pdf

Interreg Europe. (2022). From blue growth to sustainable blue economy: A new approach for the EU | Interreg Europe - Sharing solutions for better policy. https://www.interregeurope.eu/news-and-events/news/from-blue-growth-to-sustainable-blue-economy-a-new-approach-for-the-eu

Italia Domani. (2020). Piano Nazionale Di Ripresa e Resilienza. https://www.governo.it/sites/governo.it/files/PNRR_3.pdf

Johnson, C. N., Balmford, A., Brook, B. W., Buettel, J. C., Galetti, M., Guangchun, L., & Wilmshurst, J. M. (2017). Biodiversity losses and conservation responses in the Anthropocene. Science, 356(6335), 270–275.

Jolliffe, J., Jolly, C., & Stevens, B. (2021). Blueprint for improved measurement of the international ocean economy: An exploration of satellite accounting for ocean economic activity.

Kelley, E. (2016). Large marine ecosystems of the world: An annotated bibliography.

Klinger, D. H., Eikeset, A. M., Davíðsdóttir, B., Winter, A.-M., & Watson, J. R. (2018). The mechanics of blue growth: Management of oceanic natural resource use with multiple, interacting sectors. Marine Policy, 87, 356–362.

Kopetz, H. (2008). The complexity challenge in embedded system design. 2008 11th IEEE International Symposium on Object and Component-Oriented Real-Time Distributed Computing (ISORC), 3–12.

Küpper, F. C., & Kamenos, N. A. (2018). The future of marine biodiversity and marine ecosystem functioning in UK coastal and territorial waters (including UK Overseas Territories)–with an emphasis on marine macrophyte communities. Botanica Marina, 61(6), 521–535.

Lee, K.-H., Noh, J., & Khim, J. S. (2020). The Blue Economy and the United Nations' sustainable development goals: Challenges and opportunities. Environment International, 137, 105528.

Lillebø, A. I., Pita, C., Rodrigues, J. G., Ramos, S., & Villasante, S. (2017). How can marine ecosystem services support the Blue Growth agenda? Marine Policy, 81, 132–142.

Liquete, C., Piroddi, C., Drakou, E. G., Gurney, L., Katsanevakis, S., Charef, A., & Egoh, B. (2013). Current status and future prospects for the assessment of marine and coastal ecosystem services: A systematic review. PloS One, 8(7), e67737.

Lubchenco, J., & Gaines, S. D. (2019). A new narrative for the ocean. American Association for the Advancement of Science.

Mallin, F., & Barbesgaard, M. (2020). Awash with contradiction: Capital, ocean space and the logics of the Blue Economy Paradigm. Geoforum, 113, 121–132.

Manea, E., Di Carlo, D., Depellegrin, D., Agardy, T., & Gissi, E. (2019). Multidimensional assessment of supporting ecosystem services for marine spatial planning of the Adriatic Sea. Ecological Indicators, 101, 821–837.

McCann, P., & Soete, L. (2020). Place-based innovation for sustainability. Publications Office of the European Union: Luxemburg.

Milon, J. W., & Alvarez, S. (2019). Coastal resources economics and ecosystem valuation. In Water (Vol. 11, Issue 11, p. 2206). MDPI.

Morgera, E. (2020). Biodiversity as a Human Right and its Implications for the EU's External Action. European Union. https://strathprints.strath.ac.uk/75957/

Moriarty, L. F., Plucinski, M. M., Marston, B. J., Kurbatova, E. V., Knust, B., Murray, E. L., Pesik, N., Rose, D., Fitter, D., & Kobayashi, M. (2020). Public health responses to COVID-19 outbreaks on cruise ships—Worldwide, February–March 2020. Morbidity and Mortality Weekly Report, 69(12), 347.

NextGenerationEU. (n.d.). https://next-generation-eu.europa.eu/index_en

Nilsson, M., Griggs, D., & Visbeck, M. (2016). Policy: Map the interactions between Sustainable Development Goals. Nature, 534(7607), 320–322.

Northrop, E., Konar, M., Frost, N., & Hollaway, E. (2020). A Sustainable and Equitable Blue Recovery to the COVID-19 Crisis. Report. World Resources Institute, Washington, DC. Available Online at. Http://Www. Oceanpanel. Org/Bluerecovery.

Ntona, M., & Morgera, E. (2018). Connecting SDG 14 with the other Sustainable Development Goals through marine spatial planning. Marine Policy, 93, 214–222.

Obst, C., Hein, L., & Edens, B. (2016). National accounting and the valuation of ecosystem assets and their services. Environmental and Resource Economics, 64, 1–23.

Ocean Panel. (2020). High Level Panel for a Sustainable Ocean Economy. Ocean Panel. https://oceanpanel.org/

OECD. (2016). The ocean economy in 2030. OECD.

Okafor-Yarwood, I., Kadagi, N. I., Miranda, N. A., Uku, J., Elegbede, I. O., & Adewumi, I. J. (2020). The blue economy–cultural livelihood–ecosystem conservation triangle: The African experience. Frontiers in Marine Science, 7, 586.

Panaitescu, M. (2020). European Funds Management Related to the Cohesion Policy 2021-2027. EIRP Proceedings, 15(1).

Pecl, G. T., Araújo, M. B., Bell, J. D., Blanchard, J., Bonebrake, T. C., Chen, I.-C., Clark, T. D., Colwell, R. K., Danielsen, F., & Evengård, B. (2017). Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. Science, 355(6332).

Potschin-Young, M., Haines-Young, R., Görg, C., Heink, U., Jax, K., & Schleyer, C. (2018). Understanding the role of conceptual frameworks: Reading the ecosystem service cascade. Ecosystem Services, 29, 428–440.

Programme Interreg Euro-MED. (n.d.). Programme Interreg Euro-MED Official Website. Programme Interreg Euro-MED. Retrieved 11 November 2023, from https://interreg-euro-med.eu/en/

Pulselli, R. M., Struglia, M. V., Maccanti, M., Bruno, M., Patrizi, N., Neri, E., Carillo, A., Napolitano, E., Stefanatos, N., & Perakis, C. (2022). Integrating Blue Energy in Maritime Spatial Planning of Mediterranean Regions. Frontiers in Energy Research, 10, 939961.

Ramirez-Monsalve, P., & van Tatenhove, J. (2020). Mechanisms of power in maritime spatial planning processes in Denmark. Ocean & Coastal Management, 198, 105367.

Raven, J. A., & Falkowski, P. G. (1999). Oceanic sinks for atmospheric CO2. Plant, Cell & Environment, 22(6), 741–755.

Recovery and Resilience Facility. (n.d.). https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en

Recovery plan for Europe. (n.d.). https://commission.europa.eu/strategy-and-policy/recovery-plan-europe_en

Resilient Cities, R. (2019). Resilient cities, resilient lives: Learning from the 100RC network.

Riserva di Torre Guaceto. (n.d.). Riserva di Torre Guaceto—Area Marina Protetta e Riserva Naturale di Torre Guaceto. Retrieved 20 May 2023, from https://www.riservaditorreguaceto.it/index.php/it/

Rockström, J., Sachs, J. D., Öhman, M. C., & Schmidt-Traub, G. (2013). Sustainable development and planetary boundaries. JSTOR.

Rose, D. C., Mukherjee, N., Simmons, B. I., Tew, E. R., Robertson, R. J., Vadrot, A. B., Doubleday, R., & Sutherland, W. J. (2020). Policy windows for the environment: Tips for improving the uptake of scientific knowledge. Environmental Science & Policy, 113, 47–54.

Ryabinin, V., Barbière, J., Haugan, P., Kullenberg, G., Smith, N., McLean, C., Troisi, A., Fischer, A., Aricò, S., & Aarup, T. (2019). The UN decade of ocean science for sustainable development. Frontiers in Marine Science, 6, 470.

Sachs, J. D. (2015). The age of sustainable development. Columbia University Press.

Sarker, S., Bhuyan, M. A. H., Rahman, M. M., Islam, M. A., Hossain, M. S., Basak, S. C., & Islam, M. M. (2018). From science to action: Exploring the potentials of Blue Economy for enhancing economic sustainability in Bangladesh. Ocean & Coastal Management, 157, 180–192.

Schutter, M. S., Hicks, C. C., Phelps, J., & Waterton, C. (2021). The blue economy as a boundary object for hegemony across scales. Marine Policy, 132, 104673.

Sherman, K. (1991). The large marine ecosystem concept: Research and management strategy for living marine resources. Ecological Applications, 1(4), 349–360.

Silver, J. J., Gray, N. J., Campbell, L. M., Fairbanks, L. W., & Gruby, R. L. (2015). Blue Economy and Competing Discourses in International Oceans Governance. The Journal of Environment & Development, 24(2), 135–160. https://doi.org/10.1177/1070496515580797

Smith-Godfrey, S. (2016a). Defining the blue economy. Maritime Affairs: Journal of the National Maritime Foundation of India, 12(1), 58–64.

Smith-Godfrey, S. (2016b). Defining the Blue Economy. Maritime Affairs: Journal of the National Maritime Foundation of India, 12(1), 58–64. https://doi.org/10.1080/09733159.2016.1175131

Soma, K., van den Burg, S. W., Hoefnagel, E. W., Stuiver, M., & van der Heide, C. M. (2018). Social innovation–A future pathway for Blue growth? Marine Policy, 87, 363–370.

Spangenberg, J. H. (2005). Economic sustainability of the economy: Concepts and indicators. International Journal of Sustainable Development, 8(1–2), 47–64.

Spangenberg, J. H., & Settele, J. (2010). Precisely incorrect? Monetising the value of ecosystem services. Ecological Complexity, 7(3), 327–337.

SPA/RAC. (n.d.). Marine Protected Area of Torre Guaceto | Regional Activity Centre for Specially Protected Areas. Retrieved 20 May 2023, from https://www.rac-spa.org/node/890

Takakura, J., Fujimori, S., Hanasaki, N., Hasegawa, T., Hirabayashi, Y., Honda, Y., Iizumi, T., Kumano, N., Park, C., & Shen, Z. (2019). Dependence of economic impacts of climate change on anthropogenically directed pathways. Nature Climate Change, 9(10), 737–741.

The community (FLAG)—EMFF. (n.d.). Retrieved 4 October 2023, from https://pofeamp.politicheagricole.it/it/la-comunita/

The European MSP Platform. (n.d.). Introduction to MSP. Retrieved 2 November 2023, from https://maritime-spatial-planning.ec.europa.eu/msp-eu/introduction-msp

Torres, C., & Hanley, N. (2017). Communicating research on the economic valuation of coastal and marine ecosystem services. Marine Policy, 75, 99–107.

Townsend, M., Davies, K., Hanley, N., Hewitt, J. E., Lundquist, C. J., & Lohrer, A. M. (2018). The challenge of implementing the marine ecosystem service concept. Frontiers in Marine Science, 5, 359.

UNEP/MAP. (2016). MEDITERRANEAN STRATEGY FOR SUSTAINABLE DEVELOPMENT 2016-2025. Investing in environmental sustainability to achieve social and economic development. https://wedocs.unep.org/bitstream/handle/20.500.11822/7700/-Mediterranean_strategy_for_sustainable_development_2016-2025_Investing_in_environmental_sustainability_to_achieve_social_and_economic_development-20.pdf?sequence=3

UNESCO. (2022). The contribution of the UN Decade of Ocean Science for Sustainable Development to the Achievement of the 2030 Agenda. https://unesdoc.unesco.org/ark:/48223/pf0000381919

United Nations. (2015). Take Action for the Sustainable Development Goals—United Nations Sustainable Development. https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Van Hoof, L., Fabi, G., Johansen, V., Steenbergen, J., Irigoien, X., Smith, S., Lisbjerg, D., & Kraus, G. (2019). Food from the ocean; towards a research agenda for sustainable use of our oceans' natural resources. Marine Policy, 105, 44–51.

Van Staden, R. (2014). Climate Change: Implications for Cities: Key Findings from the Intergovernmental Panel on Climate Change Fifth Assessment Report. Climate Everyone's Business.

Vihervaara, P., Poikolainen, L., Nedkov, S., Viinikka, A., Adamescu, C., Arnell, A., Balzan, M., Lange, S., Broekx, S., Burkhard, B., Cazacu, C., Czúcz, B., Geneletti, D.,

Grêt-Regamey, A., Harmáčková, Z., Karvinen, V., Kruse, M., Liekens, I., Ling, M., & Zulian, G. (2018). Biophysical Mapping and Assessment Methods for Ecosystem Services.

Virdin, J., Vegh, T., Jouffray, J.-B., Blasiak, R., Mason, S., Österblom, H., Vermeer, D., Wachtmeister, H., & Werner, N. (2021). The Ocean 100: Transnational corporations in the ocean economy. Science Advances, 7(3), eabc8041.

Visbeck, M. (2018). Ocean science research is key for a sustainable future. Nature Communications, 9(1), 1–4.

Voyer, M., Quirk, G., McIlgorm, A., & Azmi, K. (2018a). Shades of blue: What do competing interpretations of the Blue Economy mean for oceans governance? Journal of Environmental Policy & Planning, 20(5), 595–616.

Voyer, M., Quirk, G., McIlgorm, A., & Azmi, K. (2018b). Shades of blue: What do competing interpretations of the Blue Economy mean for oceans governance? Journal of Environmental Policy & Planning, 20(5), 595–616.

Walz, A., Schmidt, K., Ruiz-Frau, A., Nicholas, K. A., Bierry, A., de Vries Lentsch, A., Dyankov, A., Joyce, D., Liski, A. H., & Marbà, N. (2019). Sociocultural valuation of ecosystem services for operational ecosystem management: Mapping applications by decision contexts in Europe. Regional Environmental Change, 19, 2245–2259.

Wanner, T. (2015). The New 'Passive Revolution' of the Green Economy and Growth Discourse: Maintaining the 'Sustainable Development' of Neoliberal Capitalism. New Political Economy, 20(1), 21–41. https://doi.org/10.1080/13563467.2013.866081

Winder, G. M., & Le Heron, R. (2017). Assembling a Blue Economy moment? Geographic engagement with globalizing biological-economic relations in multi-use marine environments. Dialogues in Human Geography, 7(1), 3–26.

World Bank. (2017). The potential of the blue economy: Increasing long-term benefits of the sustainable use of marine resources for small island developing states and coastal least developed countries. World Bank.

Worm, B., Barbier, E. B., Beaumont, N., Duffy, J. E., Folke, C., Halpern, B. S., Jackson, J. B., Lotze, H. K., Micheli, F., & Palumbi, S. R. (2006). Impacts of biodiversity loss on ocean ecosystem services. Science, 314(5800), 787–790.

Zhongming, Z., Linong, L., Xiaona, Y., Wangqiang, Z., & Wei, L. (2021). NEGLECTED: Environmental Justice Impacts of Marine Litter and Plastic Pollution.

3. Research Materials and Methods

Abstract

The thesis methodology chapter focuses on analysing industry clusters in the Blue Growth sectors within the Calabria region. Choosing Calabria as a case study aligns with the research question's focus on how vulnerable territories can reinforce their local performance towards green transition and resilience-based regeneration, with a specific emphasis on the Blue Economy approach. The case study is explored by experimenting on the spatial connections of Blue Growth industries cluster to assess the geographical distribution and connectivity of urban systems and sectors within the region through network analysis visualization tools. First, the research methodology utilizes the approach developed by the European Observatory for Clusters and Industrial Change (EOCIC), assessing cluster size, and specialization using employment, establishments data. The analysis uses Location Quotient (LQ) for assessing specialization. Innovative LQ measures, such as Plant and Size Quotients, are also used to examine the contribution of large firms and SMEs. Data from ISTAT spanning 2012 to 2019 is utilized. Moreover, a novel method of describing the territorial economic structure is presented by applying Spatial Network Analysis (SNA) within cluster-based analysis to characterize the importance of both location and economic interconnections. The application of network analysis using the geospatial localization of clusters allows the interactions between clusters' sectors and the context to be visualized graphically, highlighting the weak links in a system and the powerful potential connections. Additionally, understanding blue strategies on different levels to justify and/or spot shortcomings in the development process. Fourteen frameworks on the EU level were selected based on a comprehensive review and evaluated using six crucial aspects. A Multi-Criteria Analysis (MCA) is then employed to prioritize strategies that align with the study's objectives, leading to an in-depth investigation of nine selected strategies. To enrich the investigation, the analysis also tracks Blue Economy interventions within the Italian National Recovery and Resilience Plan (PNRR, Italian acronym). Also investigating the implemented Blue Economy projects utilizing platforms like Monithon and OpenCoesione to provide insights into the practical implementation. And lastly comprising a systematic examination of FLAG actions through qualitative data analysis, focusing on identifying patterns, actions, and allocation of resources across different sectors of the Blue Economy.

3.1. Research Materials and Methods

3.1.1. The philosophy behind the research design (see figure 12)

The philosophy behind the research methodology adopted in this study revolves around the exploration of economic context and inter-sectoral relationships within Calabria. The analysis started by focusing on the industry clusters. These clusters, conceptualized by Michael E. Porter, consist of interconnected firms, suppliers, related industries, and specialized institutions situated in specific fields and locations (M. E. Porter, 1998). By delving into the study of industry clusters, it becomes possible to unravel the spatial configuration of innovation, performance factors, and the flow of innovative ideas, all of which are critical components of the regional innovation (Desrochers & Sautet, 2004). Porter focused on how the mutual transparency and knowledge exchanges in spatial proximity can enhance the competitiveness of a region by encouraging local innovation processes (M. E. Porter, 1990).

In times of crisis, clusters prove capabilities to ensure quick information flow and technological capacities. Therefore, they are crucial in playing a pivotal role in Europe's recovery from the crisis. In the beginning, clusters were defined in the US by proposing 51 traded clusters (Delgado et al., 2014). From the 51 traded clusters, ten Emerging Industries were defined based on employment growth and overall size (Ketels et al., 2012). The selection of the sectors in the emerging industries reflects the strong competitiveness potential of these sectors (Ketels & Protsiv, 2014).

European Panorama of Clusters and Industrial Change analysis showed that emerging industries stood their ground better during the economic crisis, unlike traded clusters (Naumanen, 2019a). Blue Growth industries is considered one of the emerging industries. Emerging industries were shaped and affected by a number of megatrends (Izsak & zu Köcker, 2015) which are defined as "sustained forces on a global and macroeconomic level that influence the developments of business, environment, economy, society, cultures, and citizens' lives on a local and global scale" (Naisbitt & Ogletree, 1982).

To thoroughly analyse the Blue Growth industries within the Calabria region, the research methodology embraces the approach developed by the European Observatory for Clusters and Industrial Change (EOCIC). This methodology assesses the critical mass of clusters by measuring their size and specialization. Employment and establishments are utilized as indicators of size, while the Location Quotient (LQ) is employed to gauge specialization.

Moreover, the methodology incorporates innovative measures of LQ introduced by EOCIC, including the Plant and Size Quotients, which shed light on the contribution of large firms and small and medium-sized enterprises (SMEs) to the overall employment share. The research utilizes data obtained from the Italian National Institute of Statistics (ISTAT), encompassing the period from 2012 to 2019.

By applying the EOCIC methodology and these specific measures, the aim is to gain valuable insights into the performance and dynamics of the Blue Growth industries within Calabria. This analysis will contribute to a deeper understanding of the regional ecosystem and its potential for driving economic growth.

The second step visualizes the connections between cluster's sectors and the context using network analysis tools. Network analysis is a type of analysis consisting of nodes and ties (Searle et al., 2018). Although network analysis may be a marginal research tool, in the recent past, several studies have included it in the investigation of urban agglomerations and "global cities" (Sigler, 2016), innovation (Huggins & Prokop, 2017),

and evolutionary economic geography (Cassi et al., 2012; Glückler, 2007). Thus, the application of network analysis is becoming increasingly relevant, reflecting a broader trend towards the investigation of relational perspectives (Grabher, 2006). Furthermore, the application of network analysis using the geospatial localization of clusters allows the interactions between cluster's sectors and the context to be visualized graphically, highlighting the weak links in a system as well as the strong connections.

Furthermore, the research methodology also encompasses the creation of a comprehensive understanding of BE-related strategies across different levels. The analysis seeks to assess the coherence among various approaches by comparing them against the objectives established by the EU BE. This enables the thorough analysis and evaluation of the effectiveness and relevance of BE strategies across different levels, thus contributing to a deeper understanding of sustainable BE management.

The methodology involves several key steps. Firstly, a meticulous review of relevant strategies for sustainable BE management is conducted, resulting in the selection of 14 frameworks based on a comprehensive literature search and examination of official documents. These strategies are then characterized and critically evaluated based on six crucial aspects: domain, geographic scope, level, user, dimensions, and sectors covered.

To facilitate a structured comparison of the selected strategies, a Multi-Criteria Analysis (MCA) is employed. Specific criteria or aspects are identified and assigned points to prioritize strategies that align most closely with the study's objectives. Strategies scoring a minimum of 6 out of 8 points are subjected to further analysis to evaluate their effectiveness.

The study also identifies interventions within PNRR that are linked to BE, categorizing these linkages as strong, medium, or weak connections.

At the regional and local levels, in addition to official documents, platforms such as Kohesio and OpenCoesione are utilized to track implemented BE projects that align with EU, national, and regional strategies. The examination extends to specific implementation actions and tools at the local level that are connected to BE strategies. Additionally, the analysis involves a systematic examination of Fisheries Local Action Groups' (FLAGs) actions using qualitative data analysis to identify patterns, actions, and the allocation of resources in different sectors of the BE.

In conclusion, understanding the philosophy behind the research design is pivotal to appreciating the foundation upon which the case study approach and case selection are built. In the following section, the case study approach will be discussed along with the rationale behind the selection of a specific case.

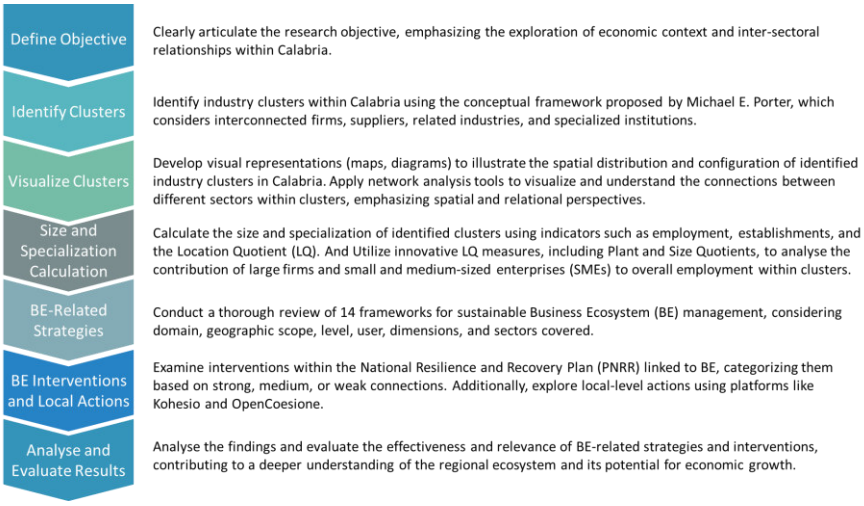


Fig. 12. Methodological Framework for Analysing Blue Economy in Calabria: From Cluster Identification to Sustainable Growth Strategies

3.1.2. The case study approach and case selection

The case study approach is a widely recognized research method that allows in-depth exploration and analysis of complex phenomena within their real-life contexts. It is commonly employed in various fields, including social sciences, business, psychology, and education, among others (Simons, 2009). This approach involves investigating a particular individual, group, organization, or event, referred to as a "case," to gain a comprehensive understanding of the topic under investigation.

Case studies are particularly valuable when researchers aim to explore intricate issues, examine causal relationships, or develop theories grounded in empirical evidence. They provide an opportunity to examine phenomena in their natural settings and capture the complexity and dynamics of real-world situations. Through delving into the intricacies of a case, researchers can uncover unique insights, generate hypotheses, or even challenge existing theories.

An essential aspect of conducting a case study is the careful selection of appropriate cases that align with the research objectives. The process of case selection involves identifying cases that provide valuable information, represent relevant characteristics, and offer rich and varied data sources.

The criteria for selecting cases may vary depending on the research context. In some cases, researchers may seek to achieve maximum variation by selecting cases that differ in certain key attributes, allowing for a comprehensive exploration of various perspectives and contexts (Gustafsson, 2017). Other times, researchers may focus on selecting cases that exhibit specific characteristics or are highly relevant to the research question (Gustafsson, 2017).

Case selection also involves considering practical factors such as access to data or individuals, ethical considerations, and the feasibility of conducting the study within the available resources and time constraints.

This project focuses on coastal territories. While coastal regions make up just 4% of the Earth's overall land surface, they are home to over a third of the global population and contribute to approximately 90% of the world's marine fishery harvests (Barbier, 2017). This study takes Calabria region in Italy as a case study. Calabria's selection as a case study for this research is justified by several key factors. Firstly, Calabria is a region with unique geographical characteristics that make it particularly vulnerable and relevant to the study of vulnerability and resilience-based regeneration. Its narrow and stretched

peninsula, combined with approximately 800 kilometers of coastline, highlights the region's strong connection to the sea and its potential for the development of the BE.
Secondly, while Calabria could be acknowledged for its potential in the sea economy, it remains one of the least developed regions in Italy. This contrast presents an intriguing research opportunity to explore the challenges and opportunities that arise in a region with significant coastal heritage but limited progress in harnessing its potential.
Moreover, the social and economic conditions of Calabria further contribute to its selection as a case study. The region's underdeveloped status, coupled with embedded disparities compared to other regions, as discussed in section 1.3.3., serves as an interesting backdrop for examining how vulnerable territories can reinforce their local performance. By focusing on Calabria, the research can shed light on the strategies, policies, and initiatives that can facilitate green transition and resilience-based regeneration in economically disadvantaged regions.
Furthermore, the determined efforts of officials in Calabria, coupled with substantial funds earmarked for the region's economic revitalization in 2021, create an ideal setting for investigating its potential for growth and transformation[4]. Notable initiatives include the National Recovery and Resilience Plan (PNRR) and the React-EU package, directing billions of euros toward the South, emphasizing a commitment to overcoming regional disparities. The research can analyze the effectiveness of these initiatives and identify potential barriers and success factors that could inform similar endeavors in other vulnerable territories.

Case conditions; Geographic, demographic, and socioeconomic context of Calabria

The case study unit of analysis is the Calabria region, categorized as a less developed region for the EU programming period 2021–2027 (European Commission. Statistical Office of the European Union., 2023). It is a NUTS III Level region with two million inhabitants and a surface of 15.222 km^2, representing about 5% of the Italian territory. Calabria's Gross Domestic Product (GDP) at about 60% of the EU average and unemployment at around 20%. It integrates 5 provinces, Catanzaro, Cosenza, Crotone, Reggio di Calabria, and Vibo Valentia, that contain 45 local Labour Market Areas (LMAs).
Calabria 4presents weak socio-economic performance indicators among the southern Italian "less developed regions". As an example, it shows very high poverty at the individual (34.6%) and family (30.6%) incidence levels compared to the national level (15.0% and 11.8% respectively) (Istat, 2020), and a gross domestic product (GDP) of 33,619.41 MEUR (Eurostat) (see Tables 4 and 5).

Table 4. Individual and family relative poverty rate in Southern Italian "less developed regions" (Istat, 2020)

Indicator	Calabria	Sicily	Campania	Puglia	Italy
Individual relative poverty rate (%)	34.6	26.0	29.5	22.8	15.0
Family relative poverty rate (%)	30.6	22.5	24.9	20.0	11.8

[4] https://www.confcommercio.it/-/mezzogiorno

Table 5. Gross domestic product (source, Eurostat 2021) in Southern Italian Regions—less developed regions (Eurostat)

Indicator	Calabria	Sicily	Campania	Puglia	Italy
Gross Domestic Product (Millions of Euros)	33,619.41	89,365.04	109,630.67	77,475.32	1,789,747

Calabria's local Labour Markert Areas (LMA)

Within the region, we shed light on Calabria's LMAs (Figure 13) as the spatial unit and the intra-regional development unit of analysis. To elaborate more, LMAs started when the American concept of Standard Metropolitan Areas was introduced (Casado-Díaz, 2000). This attempted to describe the pattern of people's activity within an urban area based on their work trips. LMA is "a geographical area surrounding a central city (or cities a few miles apart) in which there is a concentration of labour demand, and in which workers can change their jobs without changing their residences" (Goodman, 1970). Labour markets are crucial for the performance of the cluster and one of its distinct constituent elements. It represents the local labour pool in which the transfer of knowledge and technology is easy between firms (Casado-Díaz & Taltavull de La Paz, 2007a). In other words, LMAs are based on a territorial unit whose boundaries, regardless of the administrative organization of the territory, are determined using the flows of daily home/work trips (commuting) (Suedekum et al., 2014). The LMA concept has been widely used for administrative and research purposes and has been successfully applied in Italy (Rangone, 2002). Furthermore, LMAs are crucial to understanding the performance of the labour markets and one of its distinct constituent elements (Casado-Díaz, 2000). They represent the local labour pool in which the transfer of knowledge and technology is easy between firms (Casado-Díaz & Taltavull de La Paz, 2007b; W. Zhang et al., 2020). Table 6 shows the LMAs' populations in Calabria, which may have an influence on the results.

Fig. 6. LMAs in Calabria.

Table 6. Local Labour Market Areas' population in 2019 (ISTAT, 2019)

LMA	Population in Thousands	LMA	Population in Thousands
Acri	22.9	Gioia Tauro	58.9
Amantea	27.5	Locri	38.6
Belvedere Marittimo	21.9	Marina Di Gioiosa Ionica	20.3
Cariati	17.7	Melito Di Porto Salvo	34.2
Cassano All'ionio	49.3	Oppido Mamertina	7.2
Castrovillari	59.9	Polistena	43.5
Cetraro	13.7	Reggio Di Calabria	215.0
Cosenza	259.3	Roccella Ionica	18.2
Mormanno	16.7	Rosarno	29.2
Paola	31.3	Sant'eufemia D'aspromonte	7.4
Praia A Mare	13.5	Stilo	8.7
San Giovanni In Fiore	21.6	Taurianova	18.3
San Marco Argentano	30.7	Cirò Marina	25.8
Scalea	25.5	Crotone	119.0
Catanzaro	146.9	Mesoraca	6.6
Chiaravalle Centrale	14.8	Petilia Policastro	17.6
Sellia Marina	29.4	Serra San Bruno	15.1
Soverato	41.4	Soriano Calabro	12.5
Lamezia Terme	130.4	Tropea	22.2
Bianco	15.4	Vibo Valentia	101.9
Bovalino	26.2	Corigliano-Rossano	99.4
Delianuova	5.8	Nova Siri	13.7

3.1.3. Multiple research methods

Blue Growth industries in Calabria

In order to understand a system and evaluate the economic growth of a given region, the inter-sectoral relationships should be examined (Bento et al., 2021). By dividing the economic system into interrelated sectors, clusters show exactly which sectors are closely related (Bell, 2005; Tallman et al., 2004). As for Blue Growth industries, it was affected by the changing mobility paradigm, driven by automation, green and circular economy, and smart mobility trends (Sirtori et al., 2019). These industries cover traditional and new, and high-growth sectors (Naumanen, 2019a). It consists of 33 sectors (table 7) that evolved from 15 clusters.

Table 7. Sectors in Blue Growth industries as was classified in the Statistical Classification of Economic Activities in the European Community (NACE), which are cutting across different clusters.

Blue Growth industries	NACE Code	Sectors' names	Cluster
	35.12	Transmission of electricity	Electric power generation and transmission
	35.11	Production of electricity	
	79.11	Travel agency activities	Hospitality and tourism
	77.32	Renting and leasing of construction and civil engineering machinery and equipment	Distribution and electronic commerce
	52.10	Warehousing and storage	

	46.14	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	
	77.34	Renting and leasing of water transport equipment	
	42.91	Construction of water projects	Construction products and services
	73.11	Advertising agencies	Marketing, design, and publishing
	72.19	Other research and experimental development on natural sciences and engineering	Education and knowledge creation
	52.22	Service activities incidental to water transportation	Water Transportation
	33.15	Repair and maintenance of ships and boats	
	50.10	Sea and coastal passenger water transport	
	50.30	Inland passenger water transport	
	50.40	Inland freight water transport	
	30.11	Building of ships and floating structures	
	30.12	Building of pleasure and sporting boats	
	50.20	Sea and coastal freight water transport	
	25.99	Manufacture of other fabricated metal products n.e.c.	Downstream metal products
	22.19	Manufacture of other rubber products	Vulcanized and fired materials
	28.11	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	Production technology and heavy machinery
	28.22	Manufacture of lifting and handling equipment	
	36.00	Water collection, treatment and supply	Environmental services
	03.11	Marine fishing	Fishing and fishing products
	03.12	Freshwater fishing	
	10.20	Processing and preserving of fish, crustaceans and molluscs	
	52.24	Cargo handling	Transportation and logistics
	52.23	Service activities incidental to air transportation	
	52.29	Other transportation support activities	
	49.41	Freight transport by road	
	71.12	Engineering activities and related technical consultancy	Business services
	71.20	Technical testing and analysis	
	09.10	Support activities for petroleum and natural gas extraction	Oil and gas production and transportation

The study focuses on selected characteristics depicting the Blue Growth industries' current and past dynamics. The European Observatory for Clusters and Industrial Change (EOCIC) methodology is followed for measuring the Blue Growth industries' performance existing in Calabria region. The EOCIC shows the extent to which clusters have achieved this specialised critical mass by employing size and specialisation measures. This study examined the industries' size and specialisation by measuring the employment, establishments, and Location Quotient (LQ). The size is measured by the number of employees within the industry. On the other hand, LQ provides insights into the employment specialisation of the region. Then, added a few additional calculations based on EOCIC 2020 report. The new LQ additional formulas consist of the number and size of plants, represented by the Plant and Size Quotient respectively. The data was retrieved from the Italian National Institute of Statistics (ISTAT). After data collection, the next step was to check the internal consistency of the indicators as appropriate for the study. Since the study focuses on LMA, the data was, therefore, transformed from more than 400 local administrative units to 45 LMAs and from NACE 3-digit level to NACE 4-digit level for more granularity (table 8).

Table 8. Data Frame Structure

	Year (2012-2019)	
Data type	Number of establishments	Average number of employees
NACE code	Sector's code (4 digits)	Sector's code (4 digits)
Italy		
South		
Calabria		
LMAs		

The retrieved data was for eight years, 2012 to 2019; however, the analysis shown in this article is only for 2019 to try to get the most recent picture of the system. The measures adopted for size and specialisation are described as follows:

- Size
  - Employment

The size was calculated by measuring the LMAs' share of the total Italian employment in Blue Growth industries. It is calculated using the following formula:

$$Size_{r,b} = \frac{e_{b,r}}{E_{b,i}} \quad (1)$$

Where
eb,r is the employment in Blue Growth industries b in LMA r and
Eb,i is the employment in Blue Growth industries b in Italy i

  - Establishments

As for the number of establishments, the network visualisation tool was the only tool used to analyse the region's data. Nevertheless, the number of establishments was used later in the calculations of LQ.

- Specialisation
  - Location Quotient (LQ)

The Location Quotients method is adapted to identify the extent to which clusters have achieved their specialisation. LQ compares the proportion of employment in Blue

Growth industries in LMAs over the total employment in Italy to the proportion of total Italian employment in that Blue Growth industries over total Italian employment. The equation is as follows:

$$LQ_{b,r} = \frac{e_{b,r}/E_r}{e_{b,i}/E_i} \quad (2)$$

Where
eb,r is the employment in Blue Growth industries b in LMA r
eb,i is the employment in Blue Growth industries b in Italy i
Er is the total employment in LMA r and
Ei is the total employment in Italy i

Moreover, the EOCIC new measures of LQ were added. The additional measures of LQ help reveal if large firms, SMEs, or both have a high contribution to the employment share in Blue Growth industries. It is calculated by Plant and Siza Quotient. It is as follows:

$$LQ_{b,r} = \frac{e_{b,r}/E_r}{e_{b,i}/E_i} =$$

$$Plant\ (Concentration\ SMEs) = \frac{f_{b,r}/E_r}{f_{b,i}/E_i} \quad (3)$$

multiplied by

$$Size\ (Concentration\ large\ firms) = \frac{e_{b,r}/F_{b,r}}{e_{b,i}/F_i} \quad (4)$$

Where
fb,r is the number of firms in Blue Growth industries b in LMA r
Er is the total employment in LMA r
fb,i is the number of firms in Blue Growth industries b in Calabria/Italy i
Ei is the total employment in Calabria/Italy i
eb,r is the employment in Blue Growth industries b in LMA r
Fb,r is the total number of firms in Blue Growth industries in LMA r
eb,i is the employment in Blue Growth industries b in Calabria/Italy i and
Ei is the total number of firms in Calabria/Italy i

Other elements that were introduced by EOCIC are Beta Size and Beta Plant. They measure the influence of large firms and the influence of SMEs, respectively.

$$Plant\ Beta\ (influence\ SMEs) = \frac{covariance\ (plant\ formula\ ;LQ\ formula)}{\text{Variance (LQ formula)}} \quad (5)$$

$$Size\ Beta\ (influence\ large\ firms) = \frac{Covariance\ (size\ formula\ ;LQ\ formula)}{\text{Variance (LQ formula)}} \quad (6)$$

The point of this second measure is that the employment in Blue Growth industries might be made up for the most part by large companies in a region. However, the

industries within the same region might experience high levels of influence by SMEs. In particular, "A strong influence by number and/or size is seen if the value of beta is above 0.55. In other words, SMEs are said to exert influence on emerging industries in a region if Plant Beta is above 0.55 and Size Beta below 0.55. Large firms are seen as key influencers if the Plant Beta is below and Size Beta above the stated threshold. Both Betas can be above 0.55 as well, meaning both SMEs and large firms strongly influence emerging industries in a region" (Naumanen, 2019a). In this step, the influence of large firms vs SMEs was measured at both scales– within the region and on the national scale. To do so, the first step was to calculate Plant and Size of each LMA with respect to Calabria. Then calculate the covariance and variance to get the Plant Beta and Siza Beta. After that, the same steps were taken but with respect to Italy. The only difference between the two steps is whether to consider the number of firms and employees in Italy overall or only in Calabria.

A new way of analysing the cross sectorial linkages

In the economic geography debate, there was a question of which is more relevant for the competitiveness of firms: the places or the networks (Beije & Groenewegen, 1992). The concepts of "space of places" and "space of flows" are both crucial when it comes to cluster analysis (Boschma & Ter Wal, 2007). The idea of "space of places" expresses that location matters for learning and innovation (Lentini & Decortis, 2010). The concept of "space of flows" highlights the role of networks as the necessary form for transferring and diffusing knowledge (Castells, 1999). Therefore, it is essential to underpin and visualize the clusters' network and then con-textualize the flow to investigate the location's role in creating the whole system. In this study, not only industry networks that only reveal flows of inputs and outputs between firms were generated, but also a special dimension to the network was added to identify and anticipate locations' impact on the industry. The focus was on territorial social networking analysis, as the cluster literature has claimed that regions are drivers of innovation and economic development (Montana et al., 2001). Firms in groups benefit automatically from knowledge externalities through labour mobility, informal networks, buyer–supplier relationships or R&D cooperation. This is because tacit knowledge moves easier across short distances, and shared institutions at the cluster level facilitate the effective transfer of knowledge (Marshall & Marshall, 1920).
Spatial Network Analysis (SNA) was applied to analyze Calabria industries' networks. SNA is one of the promising tools for analysing and helping in a deep understanding of the system's complexity in terms of its inter-sectoral linkages and sectors' influence (Bevilacqua, Sohrabi, et al., 2022). It maps the network structure of the regional Blue Growth industries and describes the intersectoral linkages and their relative size in each LMA. The network was used to build a relationship graph in which nodes are bipartite and represent LMAs and sectors in the Blue Growth industries, and edges are links between them. In the network, 'ties' resulted from the existence of the industrial sectors within LMAs. Networks allow to describe the relations between the location and the sectors and evaluate the strength of connections (Ter Wal & Boschma, 2009).
The relevance of this process is twofold. First, it provides an alternative data-driven approach to assess the connectivity between LMAs and sectors from a spatial perspective. Moreover, thanks to network analysis tools, this process allows visualizing the strong, or weak connections of economic sectors and activities within the region. Second, by identifying the connectivity, this data-driven approach detects and outlines those areas within the region where development is needed and where can be

improved, providing complementary information for the definition of targeted and tailored community-based urban development actions towards resilience.

The strategies scenario for Blue Economy on different levels

The strategy analysis approach is an essential component of the urban regeneration process. This approach involves the evaluation of the internal and external factors that affect urban development, including economic, social, and environmental factors. There are different research methodologies on the strategy analysis approach in the urban regeneration field. For example, SWOT analysis is a commonly used tool in the strategy analysis approach in urban regeneration. It evaluates the strengths, weaknesses, opportunities, and threats of a particular urban area.

According to Burdett and Sudjic (2014), the SWOT analysis had used to evaluate the urban regeneration plan for the city of Barcelona, Spain. The analysis helped in identifying the strengths and weaknesses of the city, such as the availability of cultural assets and the lack of affordable housing. It also identified the opportunities and threats facing the city, such as the growing tourism industry and the impact of climate change.

Additionally, PESTEL analysis is another commonly used tool in the strategy analysis approach in urban regeneration. The PESTEL analysis evaluates the political, economic, social, technological, environmental, and legal factors that affect urban development. It is useful in identifying the external factors that can impact urban development. This analysis was used to evaluate the urban regeneration plan for the city of Lahore, Pakistan, according to Ahad and Shah (2019). It helped in identifying the political, economic, social, technological, environmental, and legal factors that could impact urban development. The analysis identified the need for improved transportation infrastructure, the importance of community engagement, and the need for environmental protection.

Moreover, there is SWOC analysis which is a variation of the SWOT analysis that includes the identification of challenges and opportunities that can be influenced by the actors involved in the urban regeneration process. The SWOC analysis evaluates the strengths, weaknesses, opportunities, and challenges of a particular urban area. Madaleno and Marques (2017) used the SWOC analysis to evaluate the urban regeneration plan for the city of Lisbon, Portugal. The analysis helped in identifying the strengths and weaknesses of the city, such as the availability of cultural assets and the lack of public participation in the decision-making process. It also identified the opportunities and challenges facing the city, such as the potential for economic growth and the difficulty of balancing economic development with social and environmental concerns.

Furthermore, Multi-criteria analysis (MCA) is a decision-making tool that can be used in the urban regeneration field to analyze and evaluate different strategies. MCA involves the evaluation of a set of criteria that are relevant to the decision-making process and assigns weights to these criteria based on their importance. It is a useful tool for strategy analysis because it allows decision-makers to consider multiple criteria simultaneously. The use of MCA can help in identifying the most suitable strategy for a particular urban area, taking into account the different factors that can impact urban development.

According to Dimitriou and Stasinopoulos (2017), MCA had used to evaluate different strategies for urban regeneration in the city of Athens, Greece. The study used a set of criteria, including economic viability, social equity, and environmental sustainability, to evaluate the different strategies. The results of the analysis showed that the most

suitable strategy for the city was the development of sustainable transportation infrastructure.

MCA can also be used to evaluate the impact of different strategies on different stakeholders. According to Malekpour et al. (2017), MCA was used to evaluate the impact of different urban regeneration strategies on different stakeholder groups in the city of Tehran, Iran. The study used a set of criteria, including environmental impact, social impact, and economic impact, to evaluate the strategies.

MCA can also be used to evaluate the trade-offs between different criteria. It was used to evaluate the trade-offs between economic development and environmental sustainability in the urban regeneration of a brownfield site in the city of Tianjin, China (Li et al. 2018). The study used a set of criteria, including economic benefits, environmental impact, and social impact, to evaluate the different strategies.

In this analysis, MCA was used to help in identifying the most suitable strategy for the topic of the analysis. The choice of analysing strategies in this study comes from the fact that, in the first place, strategies are an enactment of the future in the present. It describes the desired future, along with the process leading up to it (Kornberger, 2012). Strategy plays a crucial role in shaping the present in accordance with the future. Secondly, strategies open up a broader horizon. It offers an alternative way of thinking about space. In addition to managing the social space of communities, it manages the economic space of markets and networks, focusing on the cultural space of identity and culture, and navigating the political space of government (Kornberger, 2012). An understanding of strategies on each level will enable us to justify and/or spot shortcomings in the development process. In this study, the Blue strategies is the focus. In order to provide a comprehensive understanding of BE strategies on different levels, 4 levels were examined. The project began by collecting and compiling EU-level Blue strategies, then tracing them down to the national level in Italy. Next, exploring strategies on the regional and local levels. Since EU BE objectives offer a set of agreed terms, other approaches can be compared against them. Thus, they could serve as a standard for assessing coherence between different levels.

This provides the methodological steps for the characterisation and critical review of strategies that include or have a rule in the sustainability management of BE. Various aspects of the selected strategies were examined using methodology explained in the points below. The methodology follows the European Commission's criteria for sustainability in BE (European Commission et al., 2021). In this study, the methodology to characterise the strategies consists of applying 6 aspects to review the frameworks, namely, domain, geographic scope, level, user, dimensions, and sectors covered (see Table 9).

After that, MCA was used to compare different options (in this case strategies) using a set of criteria (referred to here as aspects) in a structured manner, in order to identify and prioritize strategies most relevant to the study's overall objectives. Frameworks were prioritized based on their potential use and relevance by allocating points for certain selected aspects.

Points were attributed to each strategy in order to determine which strategies are more aligned with BE and will be further analysed. To be selected for the effectiveness assessment, the strategy must score a minimum of 6 out of 8 points. Points were attributed for the following aspects: domain (marine and coastal environment), sustainability dimensions (environmental, economic, social). These aspects were considered as crucial for the sustainability assessment and specific enough to allow to prioritise the frameworks.

Table 9. Criteria for Evaluating Frameworks

Aspects	Award
Marine	Yes = 1 point
Coastal	Yes = 1 point
Dimensions	1 point per covered dimension
Indicators	Yes = 1 point
Data availabilit	Yes = 1 point

The steps of this part of the analysis were as follows.

1. For the EU level, review related strategies to the sustainable management of a BE. This was based on a literature search and official documents for the selection of current relevant frameworks, leading to the selection of 14 strategies, 9 of them were further analysed.
2. For the national level, identify the Blue interventions in PNRR which are directly and indirectly related to BE - the linkages were classified into 3 connections – strong, medium, and weak (see table 9).

Table 10. Criteria to classify the link intensity between PNRR interventions and BE sectors

Criteria	Strong (●●●)	Medium (●●)	Weak (●)
Blue Economy sectors	Only if the investments or reforms are allocated directly to BE sectors	Not only if investments or reforms are allocated directly to BE sectors, but also others related to utilizing water resources either directly or indirectly	Not only targeted for BE sectors and/or priorities BG sectors.

3. At the regional and local level, besides official documents on urban strategies, other platforms were additionally used to trace down BE projects. Kohesio and OpenCoesione were used to explore what projects have been implemented in response to the EU and national as well as regional strategies. It was also noted if there were any specific implementation actions or tools identified at the local level which are linked to the other levels' strategies and plans on the BE.
4. Additionally for the local level, the research investigates the strategic actions undertaken by Fisheries Local Action Groups (FLAGs) in Calabria to understand their focus on specific sectors within BE. Due to the unavailability of the new plan at the time of the study, the analysis is confined to the actions implemented during the 2014-2020 program.

As part of this study's concluding phase, an Excel-based dashboard has been developed to provide a comprehensive visualization of the data gathered during the analysis of this research on BE in Calabria. The dashboard aims to promote data accessibility and transparency by presenting key findings, trends, and insights derived from the research methodology in a user-friendly manner. Utilizing Excel's data visualization capabilities allows stakeholders, policymakers, and researchers to interactively explore and understand the allocation of resources and sectoral focus across the region. This data sharing contributes to the principles of open science, enabling broader access to research outcomes and fostering collaborative efforts towards sustainable marine development.

References

Barbier, E. B. (2017). Marine ecosystem services. Current Biology, 27(11), R507–R510.

Beije, P. R., & Groenewegen, J. (1992). A network analysis of markets. Journal of Economic Issues, 26(1), 87–114.

Bell, G. G. (2005). Clusters, networks, and firm innovativeness. Strategic Management Journal, 26(3), 287–295.

Bento, N., Fontes, M., & Barbosa, J. (2021). Inter-sectoral relations to accelerate the formation of technological innovation systems: Determinants of actors' entry into marine renewable energy technologies. Technological Forecasting and Social Change, 173, 121136.

Bevilacqua, C., Sohrabi, P., & Hamdy, N. (2022). Spatializing Social Networking Analysis to Capture Local Innovation Flows towards Inclusive Transition. Sustainability, 14(5), 3000.

Boschma, R. A., & Ter Wal, A. L. (2007). Knowledge networks and innovative performance in an industrial district: The case of a footwear district in the South of Italy. Industry and Innovation, 14(2), 177–199.

Casado-Díaz, J. M. (2000). Local labour market areas in Spain: A case study. Regional Studies, 34(9), 843–856.

Casado-Díaz, J. M., & Taltavull de La Paz, P. (2007a). An exploration of the contribution of local labour market areas to the analysis of regional clusters.

Casado-Díaz, J. M., & Taltavull de La Paz, P. (2007b). An exploration of the contribution of local labour market areas to the analysis of regional clusters.

Cassi, L., Morrison, A., & Ter Wal, A. L. (2012). The evolution of trade and scientific collaboration networks in the global wine sector: A longitudinal study using network analysis. Economic Geography, 88(3), 311–334.

Castells, M. (1999). Grassrooting the space of flows. Urban Geography, 20(4), 294–302.

Delgado, M., Porter, M. E., & Stern, S. (2014). Clusters, convergence, and economic performance. Research Policy, 43(10), 1785–1799.

Desrochers, P., & Sautet, F. (2004). Cluster-based economic strategy, facilitation policy and the market process. The Review of Austrian Economics, 17(2), 233–245.

European Commission, European Climate, & Infrastructure and Environment Executive Agency. (2021). Sustainability criteria for the blue economy: Main report. Publications Office of the European Union. https://data.europa.eu/doi/10.2826/399476

European Commission. Statistical Office of the European Union. (2023). Eurostat regional yearbook: 2023 edition. Publications Office. https://data.europa.eu/doi/10.2785/606702

Eurostat. (n.d.). Gross Domestic Product (GDP) at Current Market Prices by NUTS 2 Region. https://ec.europa.eu/eurostat/web/main/data/database

Glückler, J. (2007). Economic geography and the evolution of networks. Journal of Economic Geography, 7(5), 619–634.

Goodman, J. F. (1970). The definition and analysis of local labour markets: Some empirical problems. British Journal of Industrial Relations, 8(2), 179–196.

Grabher, G. (2006). Trading routes, bypasses, and risky intersections: Mapping the travels ofnetworks' between economic sociology and economic geography. Progress in Human Geography, 30(2), 163–189.

Gustafsson, J. (2017). Single case studies vs. multiple case studies: A comparative study. https://www.diva-portal.org/smash/get/diva2:1064378/FULLTEXT01.pdf

Huggins, R., & Prokop, D. (2017). Network structure and regional innovation: A study of university–industry ties. Urban Studies, 54(4), 931–952.

ISTAT. (2019). Labour Market Areas. https://www.istat.it/en/labour-market-areas

Istat. (2020). Indagini sul Reddito e Condizioni di Vita. https://www.istat.it/it/files//2020/05/18_Calabria_Scheda.pdf

Izsak, K., & zu Köcker, G. M. (2015). European Cluster Trends. Executive Summary. Report, European Cluster Observatory.

Ketels, C., Lindqvist, G., & Sölvell, Ö. (2012). Strengthening clusters and competitiveness in Europe. The Role of Cluster Organisations. The Cluster Observatory, 56, 56.

Ketels, C., & Protsiv, S. (2014). European cluster panorama 2014. Center for Strategy and Competitiveness Stockholm School of Economics, European Cluster Observatory.

Kornberger, M. (2012). Governing the city: From planning to urban strategy. Theory, Culture & Society, 29(2), 84–106.

Lentini, L., & Decortis, F. (2010). Space and places: When interacting with and in physical space becomes a meaningful experience. Personal and Ubiquitous Computing, 14, 407–415.

Marshall, A., & Marshall, M. P. (1920). The economics of industry. Macmillan and Company.

Montana, J., Reamer, A., Henton, D., Melville, J., & Walesh, K. (2001). Strategic Planning in the Technology-Driven World: A Guidebook for Innovation-Led Development.

Naisbitt, J., & Ogletree, E. J. (1982). Transforming Our Lives.

Naumanen, M. (2019). European panorama of clusters and industrial change: Emerging industries: Driving strength in 10 cross-sectoral industries. European Commission EC.

Porter, M. E. (1990). The competitive advantage of nations. Competitive Intelligence Review, 1(1), 14–14.

Porter, M. E. (1998). Clusters and the new economics of competition (Vol. 76). Harvard Business Review Boston.

Rangone, M. (2002). I sistemi locali del lavoro come mercati locali del lavoro. I Sistemi Locali Del Lavoro Come Mercati Locali Del Lavoro, 1000–1024.

Searle, G., Sigler, T., & Martinus, K. (2018). Firm evolution and cluster specialization: A social network analysis of resource industry change in two Australian cities. Regional Studies, Regional Science, 5(1), 369–387.

Sigler, T. J. (2016). After the 'world city'has globalised: Four agendas towards a more nuanced framework for global urban research. Geography Compass, 10(9), 389–398.

Simons, H. (2009). Case study research in practice. Case Study Research in Practice, 1–200.

Sirtori, E., Caputo, A., Colnot, L., Ardizzon, F., & Scalera, D. (2019). European Cluster and Industrial Transformation Trends Report. Luxembourg: Publications Office of the European Union.

Suedekum, J., Wolf, K., & Blien, U. (2014). Cultural diversity and local labour markets. Regional Studies, 48(1), 173–191.

Tallman, S., Jenkins, M., Henry, N., & Pinch, S. (2004). Knowledge, clusters, and competitive advantage. Academy of Management Review, 29(2), 258–271.

Ter Wal, A. L., & Boschma, R. A. (2009). Applying social network analysis in economic geography: Framing some key analytic issues. The Annals of Regional Science, 43(3), 739–756.

Zhang, W., Fang, C., Zhou, L., & Zhu, J. (2020). Measuring megaregional structure in the Pearl River Delta by mobile phone signaling data: A complex network approach. Cities, 104, 102809.

4. Making sense of findings: results of data analysis

Abstract

This chapter provides a comprehensive overview of the key findings of the analysis on Blue Economy in Calabria, Italy. The research reveals significant insights into various aspects of the region's economic landscape. The study uncovers a decline in Calabria's population. Additionally, regional disparities in GDP per capita are highlighted. The research further reveals employment dynamics and structural characteristics within Calabria's Blue Growth industries, shedding light on the size and specialization of LMAs in the region and shed light on firms and their impact on the economy. This chapter also shows the results from the analysis on strategies related to Blue Economy at various levels, including EU, regional, and local, emphasizing their interconnectedness and the need for effective coordination. The results show the distribution and impact of Blue projects financed by the cohesion policy in Calabria. Additionally, the analyses on FLAGs' actions in Calabria trying to get insights into what kind of actions had implemented in the groups' plans. The findings emphasize the challenges and opportunities for sustainable growth, urging improved data collection, collaboration, and comprehensive evaluation to harness the potential of Calabria's Blue Economy.

4.1. Unlocking the Blue Economy Potential and Challenges

The results section of this study presents key findings and analyses that shed light on the regional BE as means to address economic underdevelopment and vulnerability in Calabria. The research was guided by the hypothesis that the presence of large amounts of natural resources does not necessarily contribute to development if they are not managed properly. Through a comprehensive exploration of the Calabrian socioeconomic context, blue growth sectors and the examination of BE strategies, the study aimed to provide insights into how vulnerable territories like Calabria is manging its assets and how it can reinforce its local performance towards green transition and resilience-based regeneration.

To begin, it is crucial to gain a comprehensive grasp of Calabria's socioeconomic positioning at both the national and regional levels. This entails examining its relative standing compared to other regions. Calabria's population has been declined by 11.3 percent from 1991 to 2023. In terms of GDP per capita, the North-West continues to have the highest GDP per capita With 36.8 thousand euros in 2019 (36.5 thousand in 2018) (measured in nominal terms) (ISTAT, 2020). It is followed by the North-East, 35.5 thousand euros in 2019 and the Centre, 32.1 thousand euros in 2019. In the South, 19.2 thousand euros were collected (slightly more than half of the North-west's 19.2 thousand euros) (Figure 14).

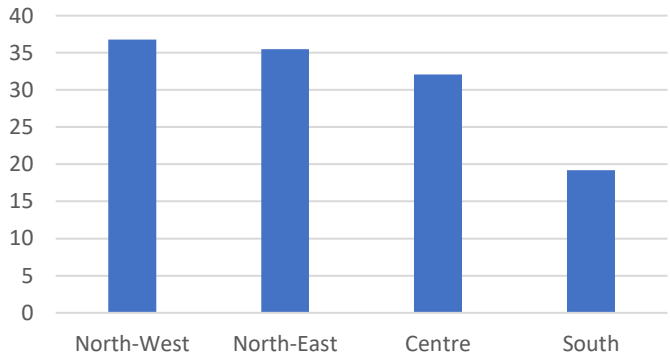


Fig. 14. Geographic GDP Segmentation in Italy (2019) in thousand euros

At the top of the regional ranking is Bolzano-Bozen Autonomous Province. Lazio is the leading central region in terms of GDP per inhabitant, 34.2 thousand euros. In the South, Abruzzo ranked first with 25.1 thousand euros, while Calabria ranked last with 17.3 thousand euros.

Calabria has the highest proportion of non-observed production, with 21.3% of total value added. Among the regions of Italy, Calabria (9.8% of value added) and Campania (8.5%) have the highest proportion of undeclared work due to irregular labour input.

In terms of net income per inhabitant, the situation of 2018 is essentially confirmed: Bolzano-Bozen is at the top with 26.9 thousand current euros (26.3 thousand in 2018), followed by Lombardia (23.3 thousand euros) and Emilia-Romagna (23 thousand euros). The final place goes to Calabria with 13.2 thousand euros (12.9 in 2018).

Nevertheless, the net income growth was higher than the national average in the South (+1.5%), where income was supported by increases in social benefits, in particular the "citizenship income". The highest changes were recorded in Sicily and Campania (+1.7%), followed by Abruzzo and Basilicata (+1.5%). The income growth in Calabria, Puglia and Sardegna is also higher than the national average. Considering this, there is a small window of hope as to how things might turn out.

4.2. Blue Growth industries in Calabria

Since the focus of this research is on BE and the analysis of industrial clusters, the main objective was to examine the blue growth industries in Calabria. Understanding industrial clusters can be complex due to the multitude of interconnections and sectors involved. As blue growth industries represent an emerging cluster, they encompass sectors from various industrial clusters. Therefore, the initial step involved gaining a visual representation of the structure of Blue Growth industries in Calabria using network visualization tool, as depicted in Figure 15. This visualization showcases the blue growth sectors and the interconnected clusters, with fifteen clusters shown in a circular layout. Some connections are relatively narrow, involving only one sector, while others are broader, with the entire cluster being part of the Blue Growth industry (e.g., the "Fishing and fishing products" cluster).
The blue growth sectors are displayed in a vertical line on the left, with the color of the nodes indicating their parent cluster. The horizontal line at the bottom of the figure represents the 45 LMAs in Calabria. To construct the image, data was not only retrieved on the sectors within the clusters but also the number of establishments within each sector. This approach provided an initial understanding of the most significant nodes for LMAs, clusters, and Blue Growth sectors.

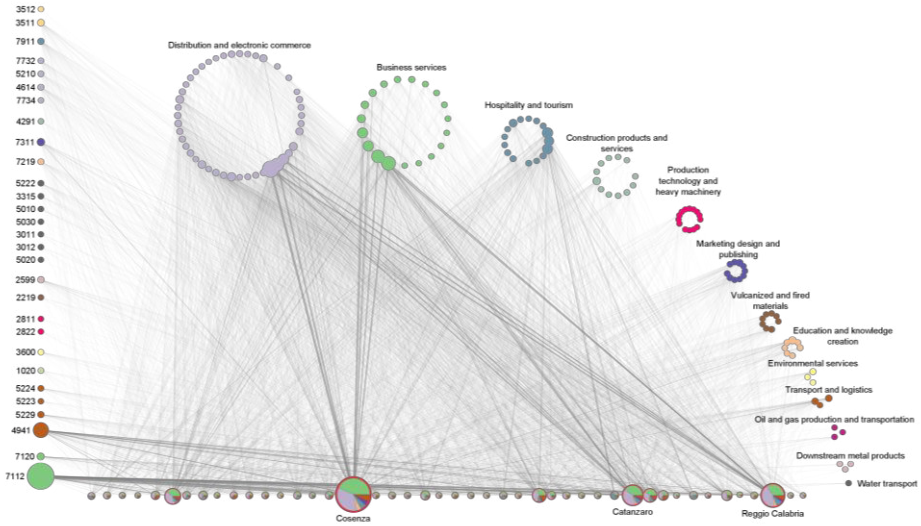


Fig. 15. Linkages between Blue Growth industries sectors and the parent clusters for the number of establishments in Calabria for 2019

Legend:
Circles: clusters.
Horizontal line: LMAs
Vertical line: Blue Growth sectors.

4.2.1. Employment

Table 11 shows the results of using formula 1 to calculate the Blue Growth industries size by measuring the LMAs' share of the total Italian employment in Blue Growth industries. From this table, notable variations among Calabria's LMAs can be observed. These LMAs, including Cosenza, Lamezia Terma, Reggio Di Calabria, Gioia Tauro, Catanzaro, and Vibo Valentia, exhibit significant size percentages. Particularly, Cosenza stands out with a size percentage of 19.19%, surpassing the other LMAs by more than double.
However, it is important to note the contrasting scenario when considering Calabria's LMAs collectively in relation to Italy as a whole. Despite the noteworthy performance of certain LMAs, the Blue Growth industries within Calabria represent only 1.44% of the

total Blue Growth industries in Italy. This stark difference raises questions about the regional distribution and potential for further growth within Calabria.

Table 11. Employment size in Calabria's LMAs for 2019

LMA	Average employment in Blue Growth industries (2019)	Size of LMAs compared to Calabria	Size for Italy
Italy	1305084.25		
Calabria	18755.54		1.44%
Acri	195.53	1.04%	0.01%
Amantea	210.95	1.12%	0.02%
Belvedere Marittimo	138.21	0.74%	0.01%
Cariati	70.2	0.37%	0.01%
Cassano All'ionio	231.36	1.23%	0.02%
Castrovillari	571.2	3.05%	0.04%
Cetraro	62.7	0.33%	0.00%
Cosenza	3599.4	19.19%	0.28%
Mormanno	71.9	0.38%	0.01%
Paola	138.1	0.74%	0.01%
Praia A Mare	168.18	0.90%	0.01%
San Giovanni In Fiore	85.9	0.46%	0.01%
San Marco Argentano	342.7	1.83%	0.03%
Scalea	189.7	1.01%	0.01%
Catanzaro	1475.08	7.86%	0.11%
Chiaravalle Centrale	60.7	0.32%	0.00%
Sellia Marina	268.2	1.43%	0.02%
Soverato	359.07	1.91%	0.03%
Lamezia Terme	1679.82	8.96%	0.13%
Bianco	85	0.45%	0.01%
Bovalino	124.65	0.66%	0.01%
Delianuova	17.5	0.09%	0.00%
Gioia Tauro	1590.38	8.48%	0.12%
Locri	224.91	1.20%	0.02%
Marina Di Gioiosa Ionica	127.21	0.68%	0.01%
Melito Di Porto Salvo	146.46	0.78%	0.01%
Oppido Mamertina	32.62	0.17%	0.00%
Polistena	535.5	2.86%	0.04%
Reggio Di Calabria	1606.01	8.56%	0.12%
Roccella Ionica	81.2	0.43%	0.01%
Rosarno	551.44	2.94%	0.04%
Sant'eufemia D'aspromonte	43.28	0.23%	0.00%
Stilo	86.8	0.46%	0.01%
Taurianova	146.45	0.78%	0.01%
Cirò Marina	165.41	0.88%	0.01%
Crotone	1225.32	6.53%	0.09%
Mesoraca	26.2	0.14%	0.00%
Petilia Policastro	185.2	0.99%	0.01%

Serra San Bruno	42.86	0.23%	0.00%
Soriano Calabro	61.66	0.33%	0.00%
Tropea	162.57	0.87%	0.01%
Vibo Valentia	1403.25	7.48%	0.11%
Corigliano-Rossano	152.47	0.81%	0.01%
Nova Siri	26.53	0.14%	0.00%

A deeper look at the internal distribution of the strengths and weaknesses of Blue Growth clusters is pivotal for fully understanding how the region is positioned for expanding its BE. Network visualisation played an essential role in the analysis. It helped in understanding regional economics and economic geography.

Figure 16 provides valuable insights into this analysis. The Freight transport by road sector acts as a "hub". It has the highest number of employees among all LMAs in Calabria, 6646.6 average number of employees. Notably, the highest proportions of employees in this sector are found in Cosenza, Lamezia Terma, and Cortona, with average numbers of 903.3, 647.1, and 641.6 employees, respectively.

The Engineering activities and related technical consultancy sector follows closely, with an average of 4,013.8 employees. A significant portion of this sector's workforce is concentrated in Cosenza. The highest number of employees are in Cosenza, Lamezia Terme, Reggio Di Calabria, Gioia Tauro, and Catanzaro, with 3599.4, 1679.8, 1606.0, 1590.4, 1475.1 average number of employees, respectively. However, some LMAs, such as Delianuova, Mesoraca, Oppido Mamertina, Serra San Bruno, and Sant'eufemia D'aspromonte, have significantly lower employment numbers (ranging from 17.5 to 43.3).

Although Cosenza is dominant in Blue Growth industries employment, it has almost no employment in "Renting and leasing of water transport equipment" and "Building of pleasure and sporting boats" sectors. As for Lamezia Terma, the highest number of employees are in "Freight transport by road", "Engineering activities and related technical consultancy", and "Service activities incidental to air transportation" sectors, 647.1, 299.9, 287.5 average number of employees, respectively.

Reggio Calabria is supposed to be a major economic centre for regional services and transport on the southern shores of the Mediterranean. The highest number of employees is in "Sea and coastal passenger water transport" sectors, 195.7.

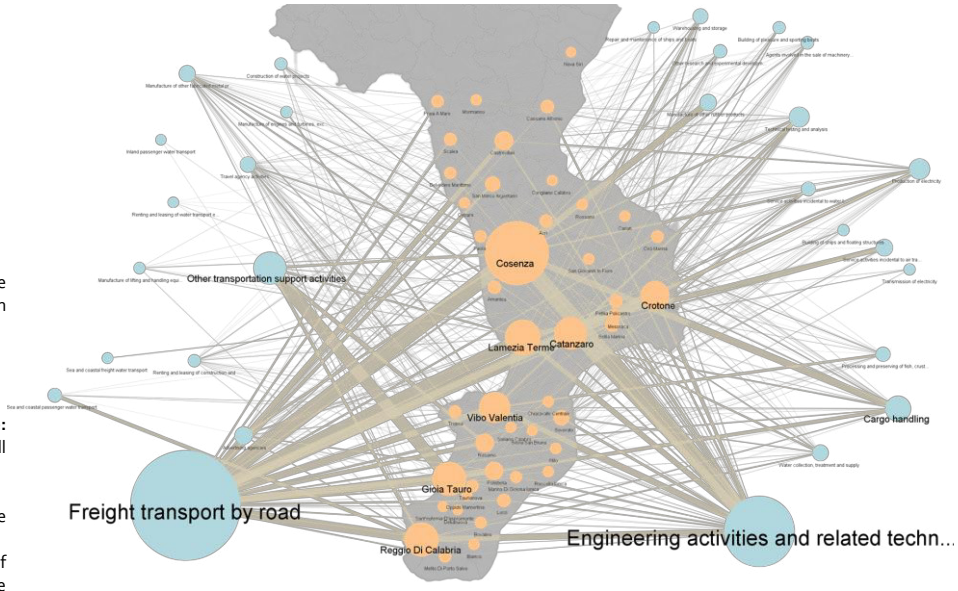


Fig. 16. Network of the average employment in Blue Growth industries in Calabria for 2019

Legend
Orange nodes: LMAs
The size of the orange node: average no. of employees in all sectors found in that LMA.
Blue nodes: Blue Growth sectors.
The size of the blue node: average no. of employees in that sector.
Edge width: average no. of employees in each sector in the connected LMA.

Gioia Tauro, which is known for its important port—one of the largest in southern Italy—occupies a key position along the Suez to Gibraltar maritime corridor. Gioia Tauro has the highest employment in "Other transportation support activities" sector, which consists, for example, of forwarding of freight services and customs activities. Catanzaro, on the other hand, is the second-highest LMA in "Production of electricity" sector with 107.6 average number of employees.

It is worth mentioning that 4 out of 33 sectors did not exist in Calabria in 2019, "Freshwater fishing", "Marine fishing", "Inland passenger water transport", and "Support activities for petroleum and natural gas extraction" sectors.

4.2.2. Number of establishments

Regarding the number of establishments, the LMAs of Crotone, Reggio Di Calabria, and Vibo Valentia show the highest number of establishments. Graph 17 reveals that the "Engineering activities and related technical consultancy" sector has the highest number of establishments in Calabria, with 3419 units, while the "Freight transport by road" sector only has 1592 units. Among the LMAs, Cosenza, Catanzaro, and Reggio Di Calabria have the highest number of "Engineering activities and related technical consultancy" establishments, with 806, 339, and 310 units, respectively. The dominant LMAs, in terms of the number of establishments, include Cosenza, Reggio Di Calabria, Catanzaro, Lamezia Terme, and Vibo Valentia, with 1373, 588, 582, 435, and 420 establishments, respectively. Conversely, the weakest sectors within the Blue Growth industries are "Inland passenger water transport" and "Sea and coastal freight water transport," each having only two establishments. Vibo Valentia's industrial area, known as "Vibo Marina," is notable for its 193 establishments in the "Engineering activities and related technical consultancy" sector and 99 establishments in the "Freight transport by road" sector. The LMAs of Delianuova, Sant'eufemia D'aspromonte, and Nova Siri are the weakest in terms of the number of establishments, with 12, 16, and 17 establishments, respectively.

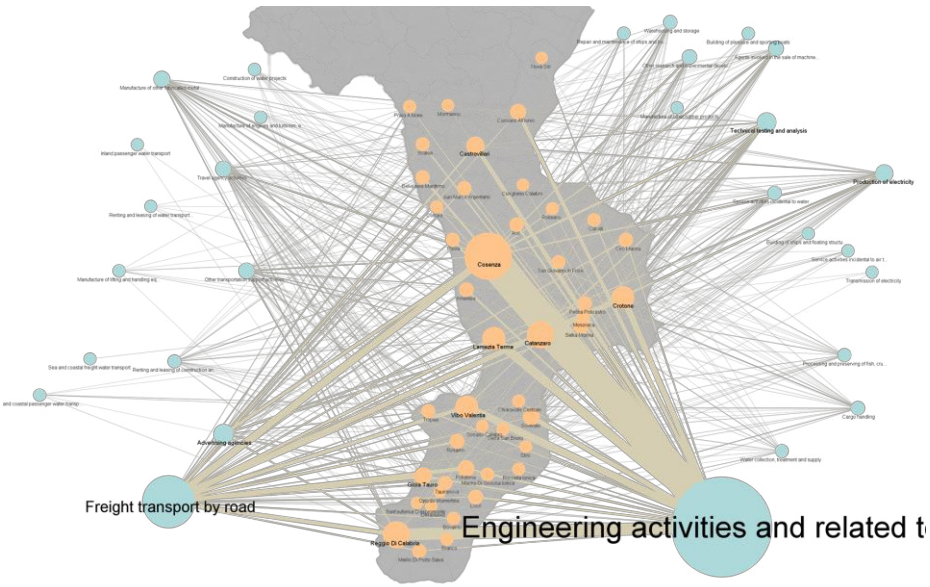


Fig. 179. Network of the number of establishments in Blue Growth industries in Calabria for 2019

Legend
Orange nodes: LMAs
The size of the orange node: no. of establishments in all sectors found in that LMA.
Blue nodes: Blue Growth sectors.
The size of the blue node: no. of establishments in that sector.
Edge width: no. of establishments in each sector in the connected LMA

4.2.3. Location Quotient (LQ)

In order to identify to what extent clusters have achieved their specialisation, Location Quotients method is adapted (see table 12 for LQ results).
In Italy, there are almost 200 thousand activities in this Blue Growth that employ almost 900 thousand people (equal to almost 3.5 per cent of the country's employment rate). BE generates an added value of 134.5 billion euros: 8.5 per cent of the total economy. However, 4 out of 5 provinces in Calabria, compared to the rest of Italy, are not yet specialised in these industries. The average employment in all industries in Italy is 1,305,084, while in Calabria, it is 187,55. This gives an overall LQ of 0.600 for Calabria, indicating a lower level of specialization in Blue Growth industries compared to the national average.
Although seas surround Calabria from most of its frontier and it is famous for its beautiful beaches, it still lacks utilising one of its critical assets. Examining the degree of specialization for each LMA, it was found that Gioia Tauro and Rosarno are the LMAs that specialize in the Blue Growth sector with an LQ of 2.824 and 2.376, respectively. Gioia Tauro was no surprise as it has one of the largest seaports in southern Italy, Port of Gioia Tauro. Gioia Tauro was ranked the second port operating in the Mediterranean Sea (ESPO, 2007). Rosarno shows specialisation in "Freight transport by road" and "Other transportation support activities" sectors that include, for example, forwarding of freight and arranging or organising of transport operations by rail, road, sea or air.
On the other hand, some LMAs in Calabria show lower levels of specialization. For instance, Corigliano-Rossano and Nova Siri have particularly low LQ values of 0.163 and 0.174, respectively, suggesting a lack of specialization in Blue Growth industries compared to the national average.
The LMAs of Cosenza, Lamezia Terme, Praia A Mare, Vibo Valentia, and Polistena also exhibit relatively high levels of specialization with LQ values above 1. However, they still fall short of the specialization levels seen in Gioia Tauro and Rosarno.
These results highlight the variation in the degree of specialization in Blue Growth industries across different LMAs in Calabria and emphasize the need for targeted interventions to foster specialization in areas where it is currently lacking.

Table 12. Location Quotient for LMAs in Calabria Region for 2019.

LMA	Average employment in all industries (2019)	Average employment in Blue Growth industries (2019)	LQ for Calabria	LQ for Italy
Italy	23214.949	1305084		
Calabria	484269	18755		0.600
Acri	7311	196	0.792	0.476
Amantea	7697	211	0.812	0.488
Belvedere Marittimo	5691	138	0.719	0.432
Cariati	537	70	0.387	0.233
Cassano All'ionio	14403	231	0.476	0.286
Castrovillari	16649	571	1.016	0.610
Cetraro	3422	63	0.543	0.326
Cosenza	77555	3599	1.375	0.826
Mormanno	4762	72	0.447	0.269
Paola	8321	138	0.492	0.295
Praia A Mare	3499	168	1.424	0.855
San Giovanni In Fiore	6265	84	0.406	0.244
San Marco Argentano	8768	343	1.158	0.695
Scalea	6469	190	0.869	0.522
Catanzaro	44425	1475	0.984	0.591
Chiaravalle Centrale	3979	61	0.452	0.271
Sellia Marina	7606	268	1.045	0.627
Soverato	11548	359	0.921	0.553
Lamezia Terme	3996	1680	1.245	0.748
Bianco	4075	85	0.618	0.371
Bovalino	8251	125	0.448	0.269
Delianuova	1761	18	0.294	0.177
Gioia Tauro	1668	1590	2.824	1.696
Locri	983	225	0.678	0.407
Marina Di Gioiosa Ionica	5245	127	0.718	0.431
Melito Di Porto Salvo	9665	146	0.449	0.270
Oppido Mamertina	2248	33	0.430	0.258
Polistena	12096	536	1.311	0.787
Reggio Di Calabria	61639	1606	0.772	0.463
Roccella Ionica	494	81	0.487	0.292
Rosarno	6874	551	2.376	1.427
Sant'eufemia D'aspromonte	2078	43	0.617	0.370
Stilo	246	87	1.045	0.628
Taurianova	5671	146	0.765	0.459
Cirò Marina	7691	165	0.637	0.383
Crotone	28834	1225	1.259	0.756

Mesoraca	1783	26	0.435	0.261
Petilia Policastro	4669	185	1.175	0.706
Serra San Bruno	4211	43	0.302	0.181
Soriano Calabro	3802	62	0.480	0.288
Tropea	5984	163	0.805	0.483
Vibo Valentia	29184	1403	1.424	0.855
Corigliano-Rossano	27685	153	0.163	0.098
Nova Siri	4529	27	0.174	0.104

Furthermore, the EOCIC new measures of LQ were integrated into the standard calculation of LQ to provide a more comprehensive understanding of the employment contribution of different firm sizes in Calabria's Blue Growth industries. By utilizing the Plant and Size Quotients, these additional measures enable a deeper analysis of the internal structure of Calabria's Blue Growth industries.

The results obtained through the application of the new LQ measures reveal intriguing insights. The Plant Beta, which captures the relative importance of large firms within the region, was calculated to be 0.34. This indicates that large firms exert a significant influence on the specialization of certain LMAs in Calabria. Similarly, the Size Beta, which accounts for the relative importance of firm size, was found to be 0.62, further underscoring the pronounced role of large firms in shaping employment patterns within the region.

Consequently, it can be inferred that the specialization observed in some LMAs in Calabria is primarily driven by the sizes of the firms operating within them, rather than the sheer number of firms. This finding highlights the need to consider the dominance of large firms when formulating policies and strategies to promote and support the development of Blue Growth industries in Calabria. The national-scale analysis also confirms this size-driven trend, with Plant Beta and Size Beta values of 0.53 and 0.74, respectively, suggesting a comparable influence of firm size on employment patterns across the entire country.

Interestingly, the lower Plant Beta and Size Beta values at the LMA scale compared to the national scale, specifically 0.34 and 0.62 versus 0.53 and 0.74, respectively, suggest a relatively lower concentration of firms within Calabria's Blue Growth industries. This implies a greater diversity and dispersion of firms across LMAs within the region. Nevertheless, it is crucial to acknowledge that the number of firms remains an important factor when considering the absolute size of employment and overall economic impact (Resbeut & Gugler, 2016). These findings shed light on the complex interplay between firm size, concentration, and employment dynamics in Calabria's Blue Growth industries, emphasizing the need for targeted policies that address the specific characteristics and needs of different LMAs.

Overall, from 2012 to 2019, the trend in LMAs in Calabria appears to be relatively stable. There is no significant increase or decrease in those areas. However, as considered one of the main LMAs in Calabria, Reggio Calabria had been experiencing a decline throughout these nine years. Additionally, "Support activities for petroleum and natural gas extraction" sector has 0 employees and establishments in all years and the same for "Inland freight water transport" sector. "Manufacture of engines and turbines, except aircraft, vehicle and cycle engines", "Transmission of electricity", "Sea and coastal freight water transport", and "Inland passenger water transport" sectors display low levels of economic activity within the region (only 0.16 per cent of the total

establishments for all the region in 2019) and low labour specialisations. Finally, higher productivity levels in "Engineering activities and related technical consultancy" and "Freight transport by road" sectors, 50 per cent, and 23 per cent of all sectors in Calabria for 2019, respectively).

Calabria's LMAs all engage in Blue Growth industries. However, they differ based on the number of connections each one has to all the sectors. For instance, Reggio Calabria, Crotone, Lamezia Terme, and Vibo Valentia have connections with 24, 24, 23, and 23 sectors, respectively. On the other hand, although Cosenza is the largest LMA in terms of the number of employment and establishments, it has only 22 sectors from Blue Growth industries. Mesoraca, Nova Siri, Delianuova, and Sant'eufemia D'aspromonte have the least sectors with 3, 4, 5, 5 sectors, respectively.

The size and specialization analysis, along with the examination of Plant Beta and Size Beta, provide a solid foundation for understanding the employment dynamics and structural characteristics of Calabria's Blue Growth industries. These insights are instrumental in informing the subsequent strategies analysis conducted in this study.

Building upon this understanding, the following strategies analysis aims to establish a comprehensive network of BE strategies at multiple levels.

4.3. The strategies scenario for Blue Economy

The study delved into a comprehensive analysis of BE at four distinct levels, namely the European, National, Regional, and Local levels, in order to assess how each of these tiers aligns with and contributes to the overarching objectives of EU's BE initiatives.

4.3.1. The EU level

The initial step involved a thorough examination of pertinent approaches to the sustainable management of the BE. This process includes the identification of 14 frameworks (see appendix A), which are chosen after an extensive literature review and a detailed analysis of official documents. These strategies are subsequently assessed and described in detail, considering six vital aspects: their focus, geographical applicability, administrative level, target audience, elements encompassed, and the specific sectors they address.

After a rigorous selection process, nine strategies were chosen for further presentation. These strategies have been carefully assessed and prioritized based on their alignment with the objectives of the EU BE and their sustainability criteria. The selected strategies encompass a range of domains, geographic scopes, levels of implementation, users, dimensions, and sectors covered. They have demonstrated a strong potential for effectiveness and have scored a minimum of 6 out of 8 points in the prioritization process.

Table 13 presents these nine strategies in detail, highlighting their key features, implementation aspects, and their contribution to the broader BE network.

4.3.2. The national level

The following table, referred to as table 14, presents an overview of the Blue interventions found within the PNRR, specifically those that have direct or indirect connections to BE. These interventions have been classified into three categories based on the strength of their connections: strong, medium, and weak.

The table provides a comprehensive summary of the identified interventions, their relevance to BE, and the level of connection they possess.
This analysis extends to assess the impact and effectiveness of these interventions in promoting sustainable management practices within BE. By evaluating their strength of connection, the potential influence and contribution could be measured for each intervention has in driving the overall sustainability agenda.
This comprehensive evaluation allows for a deeper understanding of how the PNRR and its interventions contribute to the broader BE network. It sheds light on the alignment between national recovery and resilience efforts and the goals of sustainable blue growth, providing valuable insights for policymakers, stakeholders, and researchers alike.

Table 13. Key Features and Contributions of selected-EU Strategies related to Blue Economy

Strategy Name	Objective	Scope	Key Components	Connection to Blue Economy
European Green Deal (EGD)	Address climate and environmental challenges, transitioning the EU towards a resource-efficient, competitive, and sustainable economy.	Encompasses various sectors such as energy, transport, agriculture, biodiversity, circular economy, and sustainable development.	Reduce greenhouse gas emissions, promote clean energy, transform transport, encourage circular economy, protect biodiversity, enhance energy and resource efficiency, ensure a just transition.	The sustainable use of oceans and marine resources is vital to the European Green Deal. BE plays a significant role in achieving the objectives by leveraging coastal communities' diversity, dynamism, and innovation potential. Policies, initiatives, and strategies related to oceans are integrated into the European Green Deal, supporting the development of BE. Italy's PNRR aligns with the European Green Deal, committing to national sustainability policies that further promote the growth of BE.
EU Biodiversity Strategy for 2030	Ensure the recovery of Europe's biodiversity by 2030 and align with the 2030 Agenda for Sustainable Development and Paris Agreement.	Focuses on protecting and restoring nature, enabling transformative change, and setting an ambitious Global Agenda.	1. Protecting nature: Expanding and establishing Marine Protected Areas for habitat protection and fish stock recovery. 2. Restoring nature: Addressing overexploitation of fish stocks, reducing bycatch, and mitigating practices that damage the seabed. 3. Enabling transformative change: Implementing ecosystem-based approaches for managing human activities at sea.	The EU Biodiversity Strategy for 2030 recognizes the importance of the ocean ecosystem for economic activities such as fisheries, biotechnology, and tourism. The strategy aims to restore degraded ocean ecosystems, which not only benefits biodiversity but also provides economic opportunities. Actions related to marine ecosystems, including the establishment of Marine Protected Areas and coordination with member states, contribute to the conservation and sustainable use of marine resources, aligning with the

			4. Setting an ambitious Global Agenda: Committing to more than 100 specific actions, including coordination with member states and regional sea conventions.	goals of BE and the European Green Deal.
Farm-to-Fork strategy	Make the food system more sustainable, addressing carbon emissions, pollution, and biodiversity loss.	Transform the entire food system, from farm to fork, with a comprehensive approach that includes sustainable agriculture, responsible fishing, and promoting healthy diets.	1. Sustainable Agriculture and Fishing: Promote responsible farming practices and sustainable fishing. 2. Enhancing Food Quality and Nutrition: Improve nutritional value, reduce food waste, and promote healthy diets. 3. Sustainable Food-Labelling Framework: Develop sustainable food labeling to inform consumer choices. 4. Support for Algae Industry: Recognize the potential of algae as a sustainable food source and provide targeted support.	The strategy supports responsible fishing, sustainable aquaculture, and highlights the importance of algae as an alternative protein source. It aligns with the principles of BE by promoting sustainable practices and supporting the development of alternative food sources.
EU's circular economy action plan	Ensure long-term competitiveness of the European Union's economy by decoupling economic growth from resource use through the Circular Economy Action Plan.	Implement a comprehensive framework to promote a circular economy, including waste management, resource productivity, and recycling initiatives.	1. Waste Management Infrastructure: Strengthen infrastructure for separate waste collection and modernize waste treatment plants. 2. Circular Economy Investments: Allocate resources for the development of new waste treatment facilities and support regional development. 3. Plastic Pollution Prevention: Implement regulations and initiatives	The Circular Economy Action Plan acknowledges the link between circular economy principles and BE sectors. By reducing the impact of economic activities on coastal areas and the marine environment, the plan aims to support a sustainable BE. Initiatives such as combating marine litter and promoting recycling contribute to cleaner seas and a more circular approach to resource use, aligning with the goals of BE.

			to combat marine litter, such as the Single-Use Plastics Directive. 4. Global Cooperation: Work towards a global agreement on plastics to address plastic pollution in a coordinated manner.	
Sustainable and Smart Mobility strategy	Promote sustainable and smart mobility in the maritime transport sector, leading to reduced emissions, improved intermodal connectivity, and the adoption of renewable and low-carbon fuels.	Implement a comprehensive strategy to transform ports and airports into multimodal mobility hubs, clean energy hubs, and circular economy testbeds. The strategy aims to achieve zero pollution to air and water from shipping, enhance intermodal transport, and bridge the competitiveness gap between traditional fuels and sustainable fuels.	1. Incentivizing Renewable and Low-Carbon Fuels: Encourage the use of renewable and low-carbon fuels in vessels and aircrafts by providing incentives and support for their deployment. 2. Repurposing Ports as Mobility Hubs: Transform ports into integrated hubs for different modes of transportation, clean energy systems, and circular economy initiatives. 3. Decarbonizing Shipping: Strive for a dominant position of zero-emission ships by 2030, closing the competitiveness gap between traditional and sustainable fuels. 4. Green and Digital Transport Systems: Make EU transport systems greener and more digital, improving resilience and sustainability.	The Sustainable and Smart Mobility strategy recognizes the importance of achieving sustainability in the maritime transport sector for the benefit of BE. By promoting the use of renewable and low-carbon fuels, reducing pollution from shipping, and enhancing intermodal connectivity, the strategy aims to create cleaner and more sustainable coastal areas, protect the marine ecosystem, and support the growth of BE. Ports and airports will serve as hubs for green and circular economy practices, facilitating the integration of clean energy systems and advancing sustainable maritime transportation.

Offshore Renewable Energy Strategy	Deploy significant offshore wind energy in the EU, aiming for 60 GW by 2030 and 300 GW by 2050.	Focus on offshore wind development, including fixed and floating turbines, to increase capacity and promote renewable energy.	1. Capacity Targets: Set intermediate and long-term goals for offshore wind deployment. 2. Regulatory Framework: Establish supportive policies and streamline permitting processes. 3. Industry Development: Foster growth in offshore wind manufacturing and local supply chains. 4. Research and Innovation: Drive advancements and improve efficiency in offshore wind technology.	Offshore Renewable Energy Strategy aligns with the principles of BE, promoting sustainable energy sources, reducing emissions, and fostering coastal region growth. It encourages collaboration among stakeholders and supports the environmental, economic, and social sustainability of offshore renewable projects.
EU Hydrogen Strategy	Develop and promote the production of green hydrogen as a clean and sustainable energy source.	Focus on advancing electrolysis technology and renewable electricity to produce hydrogen from water, with an aim to replace grey or brown hydrogen produced from fossil fuels. Consideration of offshore hydrogen generation alongside offshore wind parks and other	1. Electrolysis Technology: Enhance electrolyzer technology to increase efficiency and reduce costs of hydrogen production. 2. Renewable Electricity: Promote the use of renewable energy sources, such as offshore wind, for powering electrolysis and producing green hydrogen. 3. Infrastructure Development: Build a network of hydrogen refueling stations and transportation infrastructure to support the adoption of hydrogen as an energy carrier. 4. Market and Policy Support: Establish regulations, incentives, and funding mechanisms to drive investment and market uptake of green hydrogen.	The EU Hydrogen Strategy aligns with the principles of BE by promoting the use of renewable energy sources, reducing carbon emissions, and fostering economic growth and employment opportunities in the offshore hydrogen generation sector. It supports the transition towards sustainable energy use in various sectors, including transportation, industry, and agriculture, and contributes to the overall decarbonization and sustainability goals of BE.

		renewable energy projects.		
Bioeconomy Strategy	Develop and promote the utilization of renewable aquatic biological resources in a sustainable and economically viable manner.	Focus on harnessing the potential of marine living resources, including algae, bacteria, fungi, and invertebrates, for various applications such as food, feed, pharmaceuticals, cosmetics, energy, and materials. Incorporate sectors such as agriculture, forestry, fisheries, aquaculture, and biobased industries within the broader bioeconomy framework.	1. Resource Exploration and Harvesting: Identify and explore the potential of marine biological resources, including algae and marine organisms, for various applications. 2. Processing and Value Addition: Develop technologies and processes to transform the harvested biomass into high-value products, such as food additives, pharmaceuticals, and biobased materials. 3. Market Development and Collaboration: Foster partnerships and collaborations among industry, research institutions, and policymakers to drive innovation, create market opportunities, and ensure the sustainable growth of the bioeconomy sector. 4. Policy and Regulatory Framework: Establish supportive policies, regulations, and funding mechanisms to facilitate the development and expansion of the bioeconomy sector, including sustainable resource management and waste valorization.	The bioeconomy strategy is closely linked to BE through its focus on utilizing renewable aquatic biological resources and fostering sustainable economic activities related to marine living resources. By promoting the sustainable use of marine biomass, including algae and other marine organisms, the bioeconomy contributes to the economic growth, employment creation, and innovation within BE. It also aligns with the principles of sustainable resource management, environmental protection, and the circular economy, which are central to BE concept.
European Strategy for Data	Develop a European strategy for data to enhance the	Create a single market for data within the EU, promote data	1. Single Market for Data: Establish a common European data space to facilitate data flow and harmonize data rules.	The strategy recognizes the importance of data for sustainable growth in BE. The EU BE Observatory provides valuable data and insights to inform

	data economy, increase competitiveness, and ensure data sovereignty.	sharing, and leverage data in BE and other sectors for sustainable growth and innovation.	2. Data Governance Framework: Develop a trusted framework for data governance addressing access, security, privacy, and ethics. 3. Infrastructure and Technology: Invest in data infrastructure and advanced technologies for efficient data processing. 4. Data-driven Innovation: Encourage data-driven initiatives and support research and development across sectors.	evidence-based policies. The strategy aligns with the European Green Deal and promotes climate-friendly practices and technologies in BE.

Table 14. Examination of Linked Investments and Reforms in PNRR Contributing to BE

Mission	Component	Interventions	Investments/reforms	Amount (€ billion)	% *	Sector Related to BG**	Linkage with BG
1	2	M1C2.1 Digitalisation, innovation, and competitiveness in the system of productive	Investment 1: Transition 4.0	13.38	56	Research and innovation	●
1	3	M1C3.4 Tourism	Investment 4.2: Integrated funds for the competitiveness of tourism enterprises	1.79	74.6	Coastal tourism	●●
2	1	M2C1.1 improve the capacity for efficient and sustainable waste management and the circular economy paradigm	Investment 1.2: Circular economy "lighthouse" projects	0.60	28.6	*** Marine living resources Coastal tourism	●●
			Reform 1.1: National strategy for the circular economy				●●
2	1	M2C1.2 developing a sustainable agri-food chain	Investment 2.1: Logistics development for the agri-food, fishing and aquaculture, forestry, floriculture and nursery sectors	0.80	28.6	Marine living resources	●●

2	1	M2C1.3 develop integrated projects	Investment 3.1: Green islands	0.20	54.1	Desalination Marine Renewable Energy Ocean energy Maritime transport	●●●
2	2	M2C2.1 increasing the share of energy produced from energy sources renewable	Investment 1.3: Promotion of innovative plants (including offshore)	0.20	11.5	Marine Renewable Energy Ocean energy	●●●
			Reform 1.1: Simplification of authorization procedures for onshore and offshore renewable plants, new legal framework to support renewable generation and extension of the timing and eligibility of current support schemes			Marine Renewable Energy Ocean energy	●●
2	4	M2C4.3 safeguarding the air quality and the biodiversity of the territory through the protection of green areas, soil and marine areas	Investment 3.5: Restoration and protection of the seabed and marine habitats	0.40	23.7	Marine living resources	●●●
2	4	M2C4.4 ensuring the sustainable management of water	Investment 4.1: Investments in primary water infrastructure for the security of water supply	2.00	45.7	*** Marine living resources Coastal tourism	●●●

		resources throughout cycle and the improvement of the environmental quality of inland waters and maritime	Investment 4.2: Reduction of losses in water distribution networks, including digitization and monitoring of networks	0.90	20.5		●●●
			Investment 4.3: Investments in the resilience of the irrigation agrosystem for better management of water resources	0.88	20.1		●●●
			Investment 4.4: Investments in sewage and purification	0.60	13.7		●●
			Reform 4.1: Regulatory simplification and governance strengthening for the implementation of investments in water supply infrastructure				●●●
			Reform 4.2: Measures to ensure full management capacity for integrated water services				●●●
3	2	M3C2. 1 development of the port system	Reform 1.1: Simplification of procedures for the strategic planning process			Port activities	●●●
			Reform 1.2: Implementation of the regulation defining the competitive award of concessions in port areas				●●●
			Reform 1.3: Simplify authorization procedures for cold ironing plants				●●●
			Investment 1.1: Interventions for the environmental sustainability of ports (Green Ports)	0.27	100		●●●

3	2	M3C2. 2 intermodality and integrated logistics	Reform 2.2: Interoperability of the National Logistics Platform (PLN) for the port network, in order to introduce the digitization of passenger and freight transport services				●●●
4	2	M4C2.2 support for innovation and technology transfer processes	Investment 2.2: Partnerships – Horizon Europe	0.20	9.8	Research and innovation	●●

*compared to the rest of the investments in the same intervention
**based on EU BE observatory
*** These missions are not related directly to one of the BE sectors, however, they reflect different sectors. For example, having well sustainable waste management would then reflect on saving Marine living resources and having a clean ocean that would elevate Coastal Tourism

4.3.3. The regional level

Il futuro è Calabria –2021/2027 scenari e modelli

EU had developed Cohesion Policy to strengthen its economic, social, and territorial cohesion. It aims to correct regional and national imbalances and fulfils the Union's political priorities, especially in the area of green and digital transition (European Commission, 2021b). Then, the European Commission has set an agreement with each EU country to set out the national authorities' plans on how to use EU funds in shared management for 2021-2027.

Italy will benefit from €42.7 billion of EU cohesion funds from 2021-2027, with a particular emphasis on the southern regions, as part of the Cohesion Policy Partnership Agreement signed between the Commission and Italy (European Commission, 2022). Together with national co-financing, the total Cohesion Policy allocation is €75 billion. Over €30 billion will be allocated to the less developed regions of southern Italy from the European Regional and Development Fund (ERDF) and the European Social Fund Plus (ESF+).

With this Partnership Agreement, Italy underscores its strong commitment to the Recovery and Resilience Facility's objectives. Furthermore, investments in the Cohesion Policy 2021-2027 are closely coordinated with PNRR.

In order to implement the program, it is necessary to take into account the overall programming of regional cohesion policies, including preparatory activities to enable the implementation of interventions promptly. As a result, Calabria developed its own strategic plan in late 2020, identifying the strategic guidelines that will guide the region. During the 2021-2027 period, the Cohesion Policy will concentrate its resources on five policy objectives instead of the eleven thematic objectives that were in place during the 2014-2020 period (Table 15). Accordingly, Calabria followed these five strategic objectives during its next programming cycle, also called Policy objectives (OP, Italian acronyms). The objectives are OP1; a smarter Calabria - competitiveness and innovation, OP2; a greener Calabria - climate and energy, natural resources, and circular economy, OP3; a more connected Calabria - networks, transport, and logistics, OP4; a more social Calabria - employment, skills and inclusion, and OP5; a Calabria closer to citizens - territorial development and administrative capacity ('Programmazione 2021-2027', 2021).

Table 15. Calabria's Policy Objectives Aligned with Blue Economy Goals

Objective	Key Focus Areas
OP1 (Competitiveness and Innovation) - Technological innovations in energy efficiency, waste management, and sustainable mobility	- Circular economy business models
OP2 (Climate and Energy, Natural Resources, and Circular Economy) - Waste and water management - Biodiversity and landscape preservation	- Renewable energy and hydrogen production
OP3 (Networks, Transport, and Logistics) - Development of regional networks and systems for sustainable transport and digital access	- ICT connectivity, mobility, and energy

- Importance of port networks, including Gioia Tauro's port	
OP4 (Employment, Skills, and Inclusion) - Labour market improvements and regional big data platforms - Enhancing service quality and accessibility	- Strengthening education, training, and employment opportunities
OP5 (Territorial Development and Administrative Capacity) - Digitization of services and cost reduction - Revitalization of the territory and regeneration of urban spaces - Climate change adaptation and combating coastal erosion	- Regional governance and innovative development models

According to the Regional Innovation Scoreboard (RIS) - a European statistical index that quantifies regional innovation - Calabria is in the 203rd place out of 238 European regions (NUTS classification) (*Documento Di Indirizzo Strategico Regionale*, 2021). Hence, OP1 aims to promote competitiveness, digital transformation, entrepreneurship and innovation (including inclusive growth and social enterprises), and improve the business environment in the framework of industrial adaptation to the challenges posed by globalisation. In addition to developing the regional research, innovation, and training system, there is a focus on sustainable development - green and BE. It is imperative to focus on innovation in energy efficiency and new technologies, waste management, rational use of resources, the reduction of harmful emissions into the environment, the promotion of sustainable mobility, and the management and valorisation of natural resources.

Regarding BE, it is important in OP1 to follow some directions in order to ensure the sustainable development of the BE: 1) to develop new business models based on a circular economy, particularly for mature sectors most affected by the current crisis; 2) to take advantage of the most promising technological innovations that have at present reached an adequate level of maturity. Technological innovations on the topic of the BE offer an opportunity for the development of marine activities.

The strategic priorities of this objective are 1. research, innovation, and S3, 2. Promote the growth and competitiveness of SMEs including strategies for promoting production models that hinge on the circular economy, and 3. Prioritize the digitalization of industries and services. These priorities would greatly contribute to the growth of BE in Calabria if well implemented.

On the other hand, OP2 seeks to achieve a greener and lower-carbon Europe by promoting clean and fair energy, green and blue investments, circular economy, adaptation to climate change, and risk management and prevention. The objective addresses different aspects within its context. For example, it focuses on renewable energy including hydrogen production, reducing emissions, and climate change. The same objective addresses waste and water management as well as biodiversity and landscape. According to the regional program for 2021-2027, Calabria has good availability of water, both in terms of quantity and quality. However, water network

leaks are very critical, as in the rest of the national territory. The percentage of families reporting irregularities in the water supply in Calabria is 31.3%, compared to 8.6% at a national level and 12.9% in the southern regions.

Under this objective, Calabria has set 5 priorities on which the region should concentrate its action: 1. Create a regional energy system based on the efficiency and sustainability of consumption by increasing self-production from renewable sources, 2. Improve the resilience of the regional territory, the safety of citizens, production activities, and infrastructures, 3. Ensure the availability and sustainable management of water for all by improving its quality and reducing its pollution, 4. Sustainable management of the waste cycle to have a circular economy, and 5. Promote sustainable use of the regional ecosystem by increasing the level of quality of terrestrial and marine environments. This objective shows that it has a direct link to the EU's efforts to promote renewable energy and circular economy which is undoubtedly linked to BE.

According to the regional Digital Economy and Society Index that was built by the Digital Agenda Observatory of the Milan Polytechnic, Calabria is ranked as the last region in terms of digitalization of its economy and society. Therefore, OP3 intends to support ICT connectivity, mobility, and energy at the regional level to develop regional networks and systems capable of promoting sustainable transport, smart energy grids, and high-speed digital access in order to improve connectivity at regional, local, and cross-border levels.

This objective addresses ports networks. The regional report of its strategic plan for 2021-2027 shows that Gioia Tauro's port ranks among the top in Italy (*Documento Di Indirizzo Strategico Regionale*, 2021). In the ranking of European ports for container handling, the EUROSTAT 2018 data shows that Gioia Tauro is in 8th place. Despite the generalized decline in world freight traffic, Gioia Tauro port's trend in the first quarter of 2020 remains positive if compared to the same period of the previous year. However, compared to the kilometres of coast available in southern Italy, Calabria is in a poor position compared to regions of Southern Italy with values comparable to or lower than Basilicata when it comes to supply and demand indicators, such as "availability of berths per km" and "boats per km" (RINDONE, 2019).

Thus, the region has set priorities under this objective to address the weak points in the region's connectivity. First, strengthen the digital connectivity of the regional territory in the implementation of the Italian Digital Agenda. Second, Improve the quality and efficiency of transport in terms of safety and reliability. Third, improve urban mobility systems, making them Intermodal, sustainable, and innovative.

To improve the well-being of the entire Calabrian population, OP4 aims to strengthen all forms of education, training, and work for more social inclusion. The objective prioritizes employment and labour market as well as creating platforms and regional big data which is in connection with OP1 to manage and organize services in the region. As part of the objective, educational, training, and skill development will be further enhanced. Moreover, the strategy aims at improving the quality of services and accessibility to all citizens to reduce inequalities.

The last objective (OP5) enables communities and local authorities to play a leading role, preferring developmental solutions felt by local actors. There are many focus areas of this objective. It includes the adoption of a method able to guarantee the concentration of efforts and resources, sharing the idea of regional government development, developing innovative areas of intervention, digitization of services that can bring services closer to citizens and reduce costs, and enhance social and health services. Moreover, it focuses on the revitalization of the Calabrian territory, proposing

new, sustainable, and innovative development models, fighting against housing deprivation, and fostering heritage and cultural activities with special attention to internal areas and villages. This objective focus on regenerating the urban spaces also through the enhancement of production chains including BE.
Marine coastal areas and waters are essential to the health of citizens and to the ability of the region to attract stable tourist flows. Coastal erosion is affecting 30.9% of Calabria's coasts as a result of climate change. 23% of the coasts are affected by erosion progress. Therefore, OP5 concludes with a dedicated topic on adjusting to climate change and fighting hydrogeological instability.
To sum up, these policy objectives demonstrate the region's commitment to sustainable development, innovation, and inclusivity, with significant connections to various aspects of BE. 2021-2027 scenarios and models for Calabria identifies the intervention priorities of the region and directs the action to generate value in the social and environmental field. Essentially, it stimulates territorial innovation and knowledge transfer at the same time as ensuring effective and efficient public intervention and involving private and public stakeholders. The regional program has set guidelines for each of the five strategic objectives of the 2021-2027 programming. Some of these guidelines address issues and aims that help in having sustainable BE. These guidelines need to be followed by the regional and local authorities and stakeholders.
In the upcoming section, we will delve into the analysis of local projects that aligned with the priorities of the previous plan (2014-2020) and observe the guidelines to fulfil the objectives of BE.
Furthermore, the analysis will explore how these projects have aligned with the Blue and marine development to ensure effective implementation and adherence to BE objectives. This analysis will provide valuable insights into the local-level implementation of strategies and initiatives that have successfully integrated the objectives of the previous plan while effectively supporting the principles and goals of BE.

4.3.4. Local level

The Blue projects financed by the 2014-2020 cohesion policy through Kohesio platform were investigated (European Commission). Kohesio is a new tool for discovering territorial cohesion projects across Europe. It was launched in March 2022 by the European Commission as a public online platform which collects data and information on over 1.5 million projects launched since 2014 in all 27 EU Member States. The platform characterizes projects into 13 themes within 5 policies. The policies are Smarter Europe, Greener and carbon-free Europe, Connected Europe, Social Europe, and Europe closer to citizens (see figure 18). For the themes they are: Research & innovation, Information and communication technologies, Competitiveness of SMEs, Low-carbon economy, Climate change adaptation and risk prevention, Environment protection and resource efficiency, Network infrastructure in transport and energy, Sustainable and quality employment, Social inclusion, Educational and vocational training, Efficient public administration, Technical assistance, and React EU (see table 15 for the analysis of the projects and their contribution to BE).
The analysis's goal was to create a pool of local projects specifically related to BE. The themes mentioned earlier served as a basis for constructing this data pool. The intention was to compile a comprehensive collection of projects that align with the principles and objectives of BE.

The analysis in table 16 provides valuable insights into the distribution of projects related to BE financed by the 2014-2020 cohesion policy across different themes. The table presents data on five themes: Research & innovation, ICT, Competitiveness of SMEs, Low-carbon economy, and Climate change adaptation and risk prevention.
In the theme of Research & innovation, a total of 332 projects were identified, out of which 43 projects were categorized as Blue projects. This represents approximately 13% of all projects in this theme. For the ICT theme, there were 686 projects in total, but only 2 projects were classified as Blue projects, accounting for 0% of the total projects.

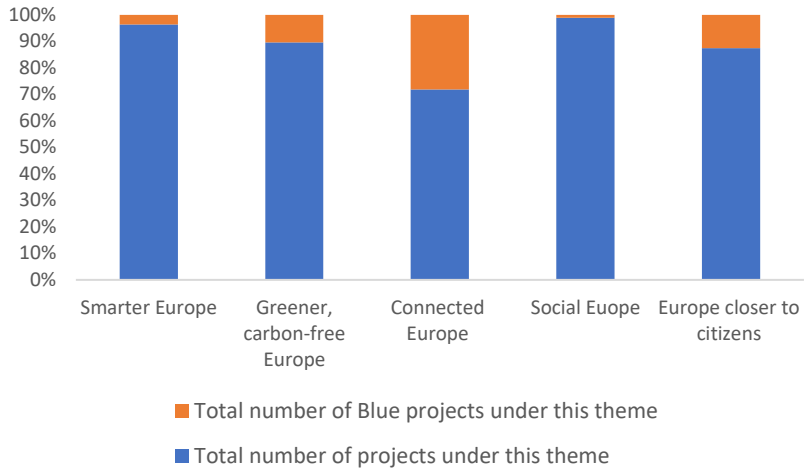


Fig. 18. Proportion of Projects Classified as Blue Within Overall Project Portfolios in These Policies

In the Competitiveness of SMEs theme, a total of 677 projects were identified, with 18 projects falling under the Blue category. This amounts to approximately 3% of all projects in this theme. In the Low-carbon economy theme, there were 231 projects, out of which 5 projects were classified as Blue projects. This accounts for approximately 2% of the total projects in this theme. Lastly, in the Climate change adaptation and risk prevention theme, there were 107 projects in total, and 35 of them were categorized as Blue projects. This represents a significant proportion of approximately 33% of all projects in this theme.
These findings highlight the varying degrees of emphasis placed on BE across different themes. While some themes demonstrate a higher percentage of Blue projects, others have a lower representation. This distribution provides insights into the priorities and focus areas of the cohesion policy in promoting BE within Calabria during the 2014-2020 period.

Table 16. Projects related to BE financed by the 2014-2020 cohesion policy.

Policy	Smarter Europe			Greener, carbon-free Europe			Connected Europe	Social Europe			Europe closer to citizens		
Theme	Research & innovation	ICT	Competitiveness of SMEs	Low-carbon economy	Climate change adaptation and risk prevention	Environment protection and resource efficiency	Network infrastructure in transport and energy	Sustainable and quality employment	Social inclusion	Educational and vocational training	Efficient public administration	Technical assistance	React EU
Total number of projects under this theme	332	686	677	231	107	229	23	564	198	4745	7	86	0
Total number projects related to BE under this theme	43	2	18	5	35	26	9	0	2	6	1	0	0
Percentage of projects related to BE under this theme	13%	0%	3%	2%	33%	11%	39%	0%	1%	0%	14%	0%	-

Using the platform's theme division made it easier in extracting and understating each project. For each theme, it was able to extract the projects related to BE either directly or indirectly. However, there could be some errors due to insufficient description of the projects in Kohesio and also in its source platform OpenCoesione, and due to some projects' wrong names or unclear names. Moreover, in some themes, for example, Research and innovations, there are projects such as Harnessing the Power of Big Data to Perform Predictive Analytics in Innovative Applications of Cross-Market. This kind of projects were not clear if it could be related to BE or not. The usage of data could happen in all the fields and having a project with this title without description made it difficult if it should be excluded it or not. It was decided to include it but categorize it is indirectly related to BE. Furthermore, this was found mostly in Research and Innovation theme. The other themes at least the title could show the orientation of the project.

In conclusion, the analysis of Blue projects financed by the 2014-2020 cohesion policy in Calabria reveals a varied distribution across different themes, indicating varying levels of emphasis on BE. While certain themes demonstrate a considerable presence of Blue projects, overall, the number of such projects in Calabria appears to be relatively low. It is important to note that the lack of clear and comprehensive data poses a challenge in accurately assessing the extent and impact of Blue initiatives in the region. The limited number of Blue projects and the potential inaccuracies in project classification highlight the need for improved data collection and reporting mechanisms. A more robust understanding of the initiatives implemented within BE sector is crucial to effectively propose and develop new paradigms that promote

sustainable growth and harness the potential of Calabria's marine resources. Further research and collaboration are necessary to bridge the data gaps and ensure a comprehensive evaluation of BE strategies in Calabria.

Fisheries Local Action Groups in Calabria

Local Action Plans

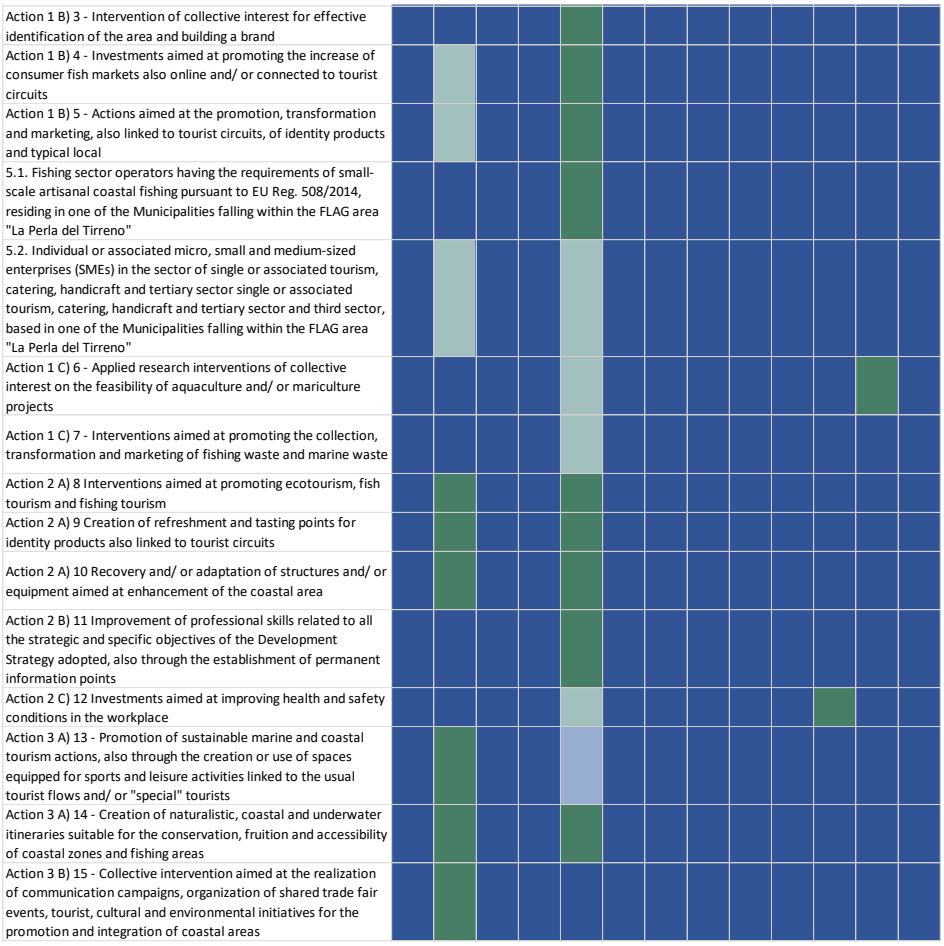
The next step in the analysis of BE strategies in Calabria led to focus on the local level, particularly community-led local development (CLLD) initiatives. Recognizing the interconnectedness of the European and national level strategies, as well as the regional development plan, the attention was turned to investigating Fisheries Local Action Groups (FLAGs). By examining the role of FLAGs in Calabria, the aim is to understand how local communities actively contribute to the implementation of BE initiatives. FLAGs serve as important platforms for community engagement and decision-making, allowing local stakeholders to shape and drive sustainable development efforts in the fisheries sector. Studying the activities and outcomes of FLAGs in Calabria help gain valuable insights into the effectiveness of community-led approaches in fostering socio-economic growth, environmental preservation, and social inclusion within BE. This comprehensive analysis, integrating European, national, regional, and local perspectives, enables to assess the overall impact of BE strategies in Calabria and identify areas for further improvement and support at the grassroots level.
The majority of actions outlined in the 2014-2020 FLAGs' plans were primarily cantered around fishing and fisheries, as indicated in Table 16. These actions were in line with the objectives of the European Maritime and Fisheries Fund (EMFF), which was the primary funding program during that period. The EMFF aimed to support fishers in transitioning to sustainable fishing practices, facilitate economic diversification in coastal communities, fund projects that generated new jobs and enhanced quality of life along European coasts, foster sustainable aquaculture development, streamline access to financing for applicants, and promote the implementation of maritime policies.
Given that FLAGs were supported by the EMFF, their actions naturally aligned with the fund's focus. This emphasis on fishing and fisheries-related initiatives was justified by the objectives and priorities set by the EMFF. Additionally, some actions in the previous plan also targeted the promotion of tourism, recognizing the significance of tourism in coastal regions and its potential to contribute to the economic growth and development of these areas.
It is important to note that the forthcoming plans for the 2021-2027 period are yet to be unveiled, and it will be essential to assess how these new plans align with the goals and priorities of BE, considering the evolving landscape and emerging sustainability challenges within the marine and coastal sectors.
In the EMFF, however, other sectors that are included in BE were not given much attention. One reason for this may be that BE is a relatively new concept that was not given much attention 10 years ago. In addition, not all BE sectors were yet established because they were still in the process of developing. The sectors were identified in the European Commission's BE Report 2018.
So far, the only plan published that has something related to FLAG is the Partnership Agreement with Italy – 2021-2027. In the agreement, under the fifth objective of the Cohesion Policy (A Europe closer to citizens) it was emphasized that EMFFA will promote sustainable BE development in coastal and inland areas through local partnerships. A participatory model (CLLD) will be supported by local territorial

strategies aimed at enhancing the human, social, cultural, and environmental resources of the communities involved in order to take advantage of the opportunities offered by BE. In particular to: i) develop the opportunities and sustainability principles of BE in fisheries, aquaculture, coastal tourism, blue biotechnology, ocean energy, ocean knowledge, expertise, maritime spatial planning, maritime surveillance and security, regional sea basin strategies; ii) contribute to the green transition through the biodiversity strategy and the "Farm to Fork" strategy and the long-term vision for EU rural areas. There will be adequate representation of relevant stakeholders. Moreover, fisheries and aquaculture will be integrated, sustainable tourism will be promoted, as well as cultural and natural resources associated with the aquatic environment will be enhanced.

The new plans for FLAGs across Calabria should follow the points mentioned earlier in the partnership agreement. There also should be some kind of equal distribution of attention. This means that not all or most of the actions are aimed at fishermen and fisheries, but also to, for example, ocean energy, biodiversity, and BE innovation.

Table 17. Actions of 3 FLAGs in Calabria

	Blue Economy Sectors												
	Blue Biotechnology	Coastal tourism	Desalination	Infrastructure and Robotics	Marine living resources	Marine non-living resources	Marine Renewable Energy	Maritime defence	Maritime transport	Ocean energy	Port activities	Research and innovation	Shipbuilding and repair
FLAG IONIO 2													
Action													
1.1.1. The "Good family fish". Promotion of sustainable, efficient and competitive fishing													
1.1.2. "Innovalia". Innovative ideas for the sustainable capture of fish													
1.1.3 "New production systems". Improvement of competitiveness of SMEs													
1.1.4. The "Paths of the fish". Tracking and traceability of our catch.													
2.1.1. The "Sea Farms". Towards a hospitality network													
2.1.2. The "Fishermen's Streets". Fishing experiences and culture of the sea													
2.2.1. "Widespread accessibility" and use													
3.1.1. resilient community. Exchange of good practices													
4.1.1. Management and animation of the PdA													
FLAG STRETTO AREA TIRRENO 2													
1.29.1 Support for the training of trainees on board small local fishing vessels													
1.29.2 - Workshops/Participation in fairs, for the dissemination of economic, technical, regulatory or scientific knowledge and innovative practices for small-scale local fishing													
1.32.1 Specific interventions to improve safety, hygiene and health on board fishing vessels													
1.42.1 Interventions aimed at promoting innovative ideas in the processing and marketing of fish and fishing waste													
1.43.1 - Creation of mobile landing places, creation of spaces and facilities in the land areas facing the sea for fishermen and complementary activities													
5.69.1 Creation of points for the collection and processing of commercial fish catches that cannot be destined for human consumption													
1.28.1 Project for the construction of a partnership network between scientific experts and fishermen to encourage collaboration and the transfer of information (co management) also in the construction of aquaculture plants													
1.30.1 Projects for the creation of naturalistic, coastal and underwater itineraries aimed at conservation, use and													
1.29.3 Project for the dissemination of economic, technical, regulatory or scientific knowledge and innovative practices.													
1.30.2 Interventions for the construction of fryers and processing laboratories													
1.30.3 Interventions for the creation of fishing tourism													
1.30.4 Interventions for the creation of fish tourism													
FLAG THE PEARL OF THE TYRRHENIAN SEA													
Action 1 A) 1 - Enhancement of identity products through the integration of fishing with processing, transformation and marketing													
2.1. Purchase of innovative equipment for the processing and transformation of identity products; integrated marketing actions of fish and craft products also through innovative systems for direct marketing of identity products													
2.2 Purchase and/ or adaptation of innovative equipment for the processing and transformation of identity products; integrated marketing actions of fish and craft products also through innovative systems for the direct marketing of identity products													



After exploring the strategies and actions on different level, there was an urge to create a hierarchical scheme stems from the need to provide a clear and structured overview of strategies related to BE. The hierarchical scheme presented in graph 19 delineates a comprehensive framework for strategies related to BE, systematically organized across multiple governance levels. At the forefront is the European Union, embodying overarching strategies that set the stage for sustainable marine and maritime practices. Descending through the tiers, national-level strategies emerge, aligning with EU directives while tailoring approaches to meet specific country contexts. The framework further extends to regional and local levels, where strategies adapt to unique geographical, economic, and social landscapes. This hierarchical arrangement reflects the interconnectedness of BE initiatives and underscores the importance of localized strategies in contributing to a harmonized and sustainable maritime ecosystem. The scheme serves as a visual guide, illustrating the nuanced deployment of strategies from the macro-level governance of the EU down to the micro-level engagement of local communities, promoting a holistic and integrated approach to BE development.

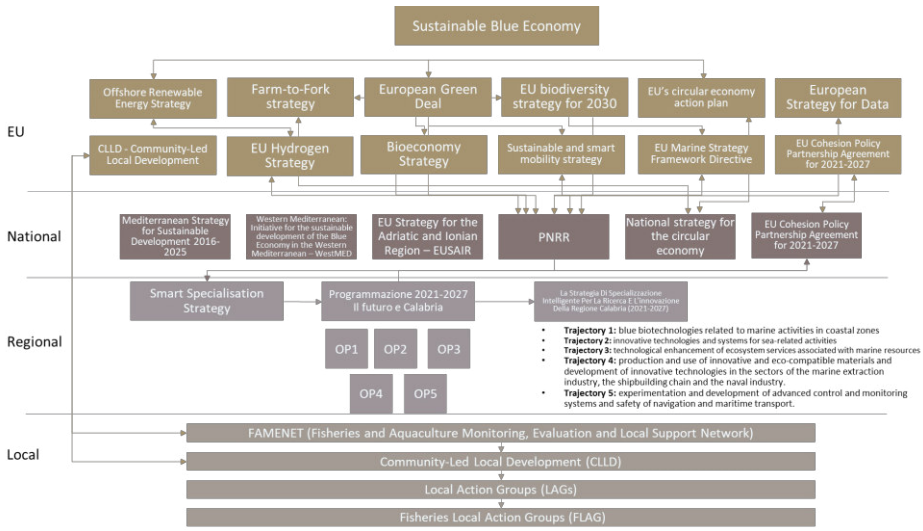


Fig. 19. Hierarchical Framework for Strategies related to Blue Economy: EU to Local Perspectives

Finally, a BE Dashboard for Calabria was created (see graph 20). It is a user-friendly interface and can be accessed online [Click here]. This dashboard offers a wealth of information and visualizations, allowing stakeholders and researchers to delve into various aspects of the region's maritime sector.

The dashboard encompasses a wide range of data and insights. It could serve as an effective resource for policymakers, researchers, and stakeholders invested in Calabria's maritime future. Its user-friendly interface and online accessibility make it an invaluable tool for fostering sustainable and inclusive development in the region's BE.

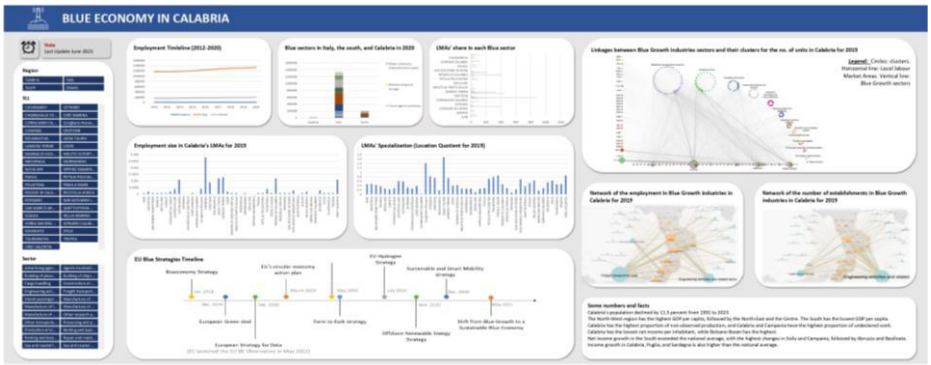


Fig. 20. A snapshot of Blue Economy in Calabria Dashboard

In conclusion, the comprehensive overview provided in this chapter underscores the intricate dynamics of Calabria's BE. A strategic approach at various levels has been explored. Furthermore, the analysis of project distribution and the actions of FLAGs has yielded valuable insights into the region's pursuit of a more vibrant BE. To facilitate a deeper understanding of these insights, the BE Dashboard for Calabria has been developed, serving as an invaluable resource for stakeholders and researchers alike. The challenges and opportunities identified throughout this study underscore the importance of enhanced data collection, collaboration, and rigorous evaluation to fully harness Calabria's BE potential.

With the key findings and insights established in this chapter, the subsequent chapter will be dedicated to an in-depth discussion of the implications of our research. The

interplay between the observed trends and their significance in the broader context of sustainable economic growth will be critically analysed. Additionally, policy recommendations that emerge from our findings and their potential impact on the region's economic landscape will be considered.

References

Documento di Indirizzo Strategico Regionale. (2021). https://partecipacalabria.regione.calabria.it/wp-content/uploads/2021/07/Documento-di-Indirizzo-Strategico-Regionale.pdf

ESPO. (2007). European Sea Ports Organisation – Annual Report 2006–2007.

European Commission. (n.d.). Kohesio: Discover EU projects in your region. Retrieved 10 November 2023, from https://kohesio.ec.europa.eu/en/

European Commission. (2021). Inforegio—New Cohesion Policy. https://ec.europa.eu/regional_policy/2021-2027_en

European Commission. (2022). EU Cohesion Policy: €42.7 billion to Italy. European Commission - European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_4562

ISTAT. (2020). Regional accounts | years 2017-2019. https://www.istat.it/it/files/2021/01/Regional_accounts_2019.pdf

Programmazione 2021-2027. (2021). Calabria Europa. https://calabriaeuropa.regione.calabria.it/programmazione-2021-2027

Resbeut, M., & Gugler, P. (2016). Impact of clusters on regional economic performance: A methodological investigation and application in the case of the precision goods sector in Switzerland. Competitiveness Review.

RINDONE, C. (2019). Coastal And Nautical Tourism In Italian Regions. WIT Transactions on the Built Environment, 188, 129–139.

5. Sustainable Blue Economy potential in Calabria (discussion)

Abstract

Chapter 5 of this thesis delves into the discussion of the Sustainable Blue Economy potential in Calabria. It identifies both the gaps and potentials in Calabria's Blue Economy, emphasizing the need to recognize the region's unique economic characteristics to foster growth effectively. Despite the relatively smaller scale of Blue Growth sectors in Calabria compared to the rest of Italy, this chapter underlines their growth potential. The discussion also addresses the limitations of the research, providing a critical perspective on the findings. It then outlines a blueprint for sustainable growth, offering a comprehensive paradigm for the development of Calabria's Blue Economy. Finally, the chapter concludes with remarks that synthesize the key insights presented throughout the research, emphasizing the importance of stakeholder engagement, policy coherence, and investments in sustainable practices to contribute to the growth of a sustainable Blue Economy in Calabria.

Gaps and potentials in Calabria's Blue Economy

The narrative of Blue Growth sectors driving a Sustainable Blue Economy is nuanced. While Blue Growth offers economic development, innovation, and job opportunities, a cautious and critical approach is necessary. The positive potential of Blue Growth must be balanced with robust environmental safeguards, social equity considerations, and international cooperation to ensure a truly sustainable and resilient Blue Economy. Bridging the gap between economic aspirations and sustainability imperatives requires ongoing evaluation, policy interventions, and a commitment to balancing economic, social, and environmental objectives in the evolving narrative of Blue Growth.

The evolution of the concept of Blue Growth has positioned it as a pivotal force in fostering a Sustainable Blue Economy, aligning with principles of environmental conservation, social equity, and economic prosperity. This evolution, evident in the European Commission's Blue Growth strategy and subsequent communications, signifies a paradigm shift towards a more holistic and sustainable approach. Blue Growth sectors, spanning aquaculture, coastal tourism, marine biotechnology, renewable energy, and mineral resources, are identified as engines for economic growth, job creation, and innovation. Technological advancements in marine biotechnology and renewable energy offer pathways to sustainable and eco-friendly practices, exemplifying the positive potential of Blue Growth.

While Blue Growth sectors hold promise, challenges and complexities arise, necessitating a nuanced perspective. Blue Growth often centres around economic activities like fisheries, aquaculture, and maritime transport, potentially leading to environmental impacts such as overfishing, habitat destruction, and pollution. The pursuit of economic gain in Blue Growth can inadvertently neglect proper environmental safeguards and resource management practices, raising concerns about the genuine alignment with sustainability principles.

While acknowledging the potential risks and concerns associated with Blue Growth initiatives, it is important to recognize the positive aspects that contribute to sustainable development. Blue Growth sectors can provide valuable opportunities for innovation and the implementation of eco-friendly technologies. For example, advancements in sustainable aquaculture practices can reduce pressure on wild fish stocks and contribute to the conservation of marine ecosystems.

Additionally, the Blue Growth paradigm, when approached with a comprehensive sustainability framework, has the potential to address social and environmental dimensions. Integrated coastal management and community-based approaches within Blue Growth projects can empower local communities, ensuring that the benefits are shared equitably. This inclusivity fosters social sustainability by involving stakeholders in decision-making processes and mitigating the risk of social inequities.

Furthermore, Blue Growth sectors can become agents of positive change by investing in research and development that focuses on environmental conservation. The implementation of responsible and ethical business practices, along with stringent environmental impact assessments, can minimize adverse effects on marine ecosystems. Emphasizing sustainable practices within Blue Growth not only aligns with environmental goals but also contributes to the longevity of the sectors themselves.

It is crucial to always integrate environmental and social considerations into the Blue Growth paradigm, the sectors can become drivers of sustainable development, ensuring a harmonious balance between economic prosperity, social well-being, and environmental conservation.

This study was meant to enhance the comprehension of BE and its performance in Calabria. The economic performance of the Blue sectors varies significantly across different levels. While industry specialization is an important driver of regional development, the size of economic activity also plays a crucial role, as recommended in the existing literature (Ketels, 2009; M. E. Porter & Ketels, 2003; Sölvell et al., 2008). Quantitative research conducted across several countries and regions has consistently shown a positive relationship between employment in strong clusters and economic performance (European Commission, 2007; Ketels, 2009; M. Porter, 2003). Therefore, in this research the size and specialization of Blue Growth industries cluster in Calabria had been analysed. Blue Growth industries is one of the largest among emerging industries in terms of total employment in Europe. It is ranked 3rd out of 10 in total employment in Europe, with approximately 13.3 million employees (Naumanen, 2019b).

When estimating the ocean's potential, it is primarily based on the interactions between different sectors. However, it is important to approach this estimation with caution, as overly optimistic expectations for growth may arise if these interactions are not adequately addressed. Consequently, the study of BE in a specific city should be oriented towards understanding that city's unique system. The system consists of several interconnected sub-systems, each exposed to different combinations of drivers and governed by distinct governance systems.

First, a snapshot of certain economic indicators in Calabria was attempted to be captured. The data highlights some concerning aspects such as population decline, lower GDP per capita, high proportion of non-observed production and undeclared work, as well as relatively low net income per inhabitant in Calabria compared to other regions.

One of the significant findings is the population decline in Calabria. A decrease of 11.3 percent over a span of more than three decades is a significant concern. Population decline can have adverse effects on the economy, including reduced labour force, decreased consumption, and challenges in sustaining public services. Addressing this issue requires comprehensive strategies to attract investment, create job opportunities, and improve living conditions, thereby encouraging people to stay or relocate to the region.

The GDP per capita indicate a notable disparity between different regions of Italy. The North-West region consistently maintains the highest GDP per capita, followed by the North-East and the Centre, while the South lags significantly behind. Such regional disparities highlight the uneven distribution of wealth and economic opportunities in the country. It calls for targeted policies and initiatives to promote economic development and reduce the wealth gap between the north and south.

Calabria's low GDP per capita and net income per inhabitant, as compared to other regions, point to the economic challenges it faces. Lower income levels can be attributed to several factors, including limited job opportunities, lower productivity, and weaker economic infrastructure. To address this, investment in key sectors, along with improved education and skills training, could help stimulate economic growth and raise living standards in the region.

The high proportion of non-observed production and undeclared work in Calabria is another concern. Non-observed production refers to economic activities that are not properly recorded or accounted for in official statistics. Undeclared work, on the other hand, involves labour that is not reported or regulated by formal labour market institutions. Both phenomena can have negative implications for the economy,

including reduced tax revenue, lower social security contributions, and unfair competition for businesses operating within the formal sector. Addressing these issues requires strengthening labour market regulations, enhancing enforcement mechanisms, and promoting a culture of compliance and transparency.

Despite the challenges, there are some positive signs of growth and potential improvements. The net income growth in the southern regions, including Calabria, indicates that the income levels are increasing at a rate higher than the national average. This growth is attributed to increased social benefits, particularly the 'citizenship income' program, which provides financial support to low-income individuals and families. The higher income growth in various southern regions suggests that these initiatives are having a positive impact and helping to alleviate poverty and inequality in those areas.

After these economic indicators were reviewed to obtain an overview of the economic situation in the region, the analysis of Blue Growth sectors in Calabria was initiated, with a focus on the essential visualization of Blue Growth industries. While the European Commission has already classified the Blue Growth industries, the utilization of network visualization through this research aids in understanding the intricate linkages between sectors and their associated clusters. This approach provides valuable insights into the interconnections that drive the growth and development of the Blue Growth industries in Calabria. Apart from the importance of network visualization that Graph 7 depicts, it highlights 3 important points; interpreting the clusters, showing the linkages, and identification of influential zones. The graph provides a visual representation of the Blue Growth industries in Calabria, showcasing the clusters and their connections. The presence of fifteen clusters indicates the existence of various interdependencies and collaborations between different sectors within the Blue Growth domain. Some clusters exhibit narrow connections, primarily based on a single sector, while others demonstrate broader connections, with the entire cluster being part of the Blue Growth industry. This suggests that certain clusters are more integrated into the overall Blue Growth framework than others.

The horizontal line at the bottom of the graph highlights the 45 LMAs in Calabria. By examining the graph, it becomes evident that certain zones, such as Cosenza, Catanzaro, and Reggio Calabria, possess a greater concentration of power and influence within the Blue Growth industries in Calabria. These zones likely play a significant role in driving the growth and development of the sector in the region.

The pie charts displayed within the LMAs' nodes reveal the distribution of establishments across different clusters. Notably, the "Distribution and electronic commerce" and "Business services" clusters have the highest number of establishments within the LMAs. This observation suggests that these sectors play a pivotal role in supporting and facilitating the growth of Blue Growth industries in Calabria. Additionally, specific clusters such as "Fishing and fishing products" and "Electric power generation and transmission" are entirely comprised of sectors that contribute exclusively to the Blue Growth industries. Notably, the "Engineering activities and related technical consultancy" sector from the "Business services" cluster contributes the highest number of establishments to the Blue Growth industries in Calabria for the year 2019.

Overall, this graph demonstrates the value of network visualization in simplifying and consolidating a wealth of information into a single image. It aids in understanding interconnections, identifying influential zones, and highlighting the pivotal role of specific sectors in driving the growth of Blue Growth industries in Calabria.

It was claimed that "…. similarities between systems often allow data from one system to carry information that has value in others" (Burgess et al., 2018b). However, the system is complex and has complicated interconnections within many sectors. For example, one cannot know if the depletion of some fish species is from overfishing or pollution or other reasons (Burgess et al., 2018b). Hence, in this study, spatial economic networks were used as a tool to absorb this complexity so that it can be used with any complex system in the future. This shows a structural analysis of the inter-sectoral linkages and main sectors of the Blue Growth industries in Calabria. Such analysis employs suitable network indicators to measure the influence of each sector on the other ones and the possibilities for clustering of related activities (Serrano et al., 2007). The Blue Growth industries shows an appreciable dynamic in cross-sectoral linkages. It "… include all sectors and industries related to a maritime environment as well as sectors producing, making use of, and treating fresh-water sources" (Naumanen, 2019b). The networks introduced in this thesis demonstrate that the marine system has very complex social-ecological systems exposed to several cross-scale interactions affecting critical ecological and socioeconomic processes and their interaction. This means that when the future BE potential is discussed, one should be aware of which processes and at which scales, or levels, are likely to drive change in fisheries.

The network visualization of Calabria's Blue Growth industries has provided a comprehensive view of the interwoven relationships and interdependencies between various sectors operating within the region. These intricate interconnections represent a valuable opportunity to leverage the synergies between different industries for the collective benefit of BE in Calabria. The networks were a tool to identify influential zones and clusters within the maritime space. These zones are often characterized by the convergence of multiple sectors, each contributing to a unique aspect of BE. By pinpointing these influential areas, the results enable a focused approach to resource allocation and development initiatives. It allows stakeholders to recognize where various industries can work together efficiently, capitalizing on their collective strengths and capabilities.

This approach closely aligns with the fundamental principle of MSP which emphasizes the promotion of collaboration across sectors. In the context of Calabria's Blue Growth sectors, this means fostering partnerships and cooperative efforts among industries that might not traditionally interact. MSP's role is to act as a facilitator, encouraging dialogue and collaboration among stakeholders from diverse sectors, such as maritime transport, fisheries, aquaculture, coastal tourism, renewable energy, and biotechnology. By doing so, MSP ensures that these industries are not working in isolation but are, instead, part of a well-coordinated and integrated ecosystem.

After that, a study on the size of Blue Growth industries in Calabria's LMAs (table 10) showed that Calabria has a very high labour shortage. Nevertheless, highlighting the double size of Cosenza compared to the other LMAs in Calabria, it would be beneficial to further analyze the factors contributing to Cosenza's exceptional size in comparison to its counterparts. Moreover, it is crucial to acknowledge the contrasting situation that arises when examining Calabria's LMAs as a whole in relation to Italy. While specific LMAs display commendable performance, the Blue Growth industries within Calabria account for a mere 1.44% of the overall Blue Growth industries in Italy. This significant disparity prompts inquiries concerning the regional distribution and the potential for future growth in Calabria.

The labour shortage could be for a lack of market-oriented management skills, lack of financial and controlling knowledge, increase in costs, few incentives, or restructuring

of some activities. Moreover, Calabria may experience low employment rates due to its comparatively lower wages (Naumanen, 2019b). Furthermore, the COVID-19 pandemic has created new circumstances. However, that does not mean there is no hope for these industries to grow. Possibilities and sustainable development for coastal communities will be attained but with challenging normative concepts and representations of economics (Garland et al., 2019). The growth can be achieved by establishing a coherent and direct understanding of the industry and relationships in economic sectors. Therefore, it is essential to understand that the place and its economies are unique.

The analysis on the size as well as the network visualization of the Blue employment in Calabria give a vital interpretation of the economic situation in Calabria. The analysis shows the key findings and their implications for the region's BE and overall economic development. First, it is important to mention that the two main sectors driving Blue Growth industries in Calabria are "Freight transport by road" and "Engineering activities and related technical consultancy." However, there was miss information about the role of marine and freshwater fishing in Calabria and other sectors. Probably to gain a comprehensive understanding of the performance of small-scale fisheries and to assess the significance of regional stakeholders in supporting these industries, qualitative data becomes imperative. Qualitative research methods can provide valuable insights into the dynamics, challenges, and opportunities within these sectors. The absence of certain sectors, such as "Freshwater Fishing," "Marine Fishing," "Inland Passenger Water Transport," and "Support Activities for Petroleum and Natural Gas Extraction," suggests untapped potential or limitations within the region's BE or limitations in the dataset. Policymakers could explore the reasons behind the absence of these sectors and assess the feasibility of their development. This analysis opens up discussions on diversification strategies, the exploration of new industries, or the need for policy interventions to attract investment and promote growth in these sectors.

In spite of this, the analysis is important to support certain points. The analysis provides valuable sector-specific insights. For example, the dominance of Cosenza in Blue Growth industries employment, coupled with its limited presence in sectors related to water transport equipment and boat building, indicates potential areas for diversification and specialization. Identifying such gaps can inform policy decisions to support the growth of these underrepresented sectors and encourage a more balanced and resilient BE.

Additionally, the importance of the Freight Transport by Road sector and Engineering activities and related technical consultancy sector. The identification of these sectors as central "hubs" in the economic network suggests their crucial role in supporting the region's Blue Growth clusters. The high number of employees in these sectors indicates a significant level of activity and potential for economic expansion. Policymakers and stakeholders should consider leveraging the sectors strengths to further develop BE, such as by improving infrastructure, optimizing logistics networks, and promoting sustainable transportation practices. This also gives sector-specific insights.

However, while road freight transport is undeniably crucial for the economic development of Calabria, it is essential to scrutinize its regional relevance through the lens of sustainable mobility principles. The freight transport sector by road can play a pivotal role in the economic development of regions, providing a critical link in the supply chain. However, while road freight transportation is often viewed as an economic strength, it may present structural weaknesses in the context of sustainability that warrant correction.

Calabria, characterized by its mountainous terrain and geographical constraints, heavily relies on road transport for freight movement. This reliance on road transportation can pose challenges to the principles of sustainable mobility. The environmental impact of road freight, including emissions, noise pollution, and wear and tear on road infrastructure, can be significant. Calabria's ecosystems and air quality may face degradation due to the high volume of road freight, potentially compromising the region's overall sustainability.

One aspect that requires attention is the potential negative impact on air quality. Road freight, especially when powered by conventional fossil fuels, contributes to air pollution, which can have adverse effects on public health and the environment. In the pursuit of sustainable mobility, there is a growing emphasis on transitioning to cleaner alternatives, such as electric or hydrogen-powered vehicles, which can help mitigate the environmental impact associated with road freight transport.

The reliance on road transport also raises concerns about the efficiency and resilience of the supply chain. In the context of sustainable mobility principles, a diversified and integrated transportation network that includes alternatives like rail and maritime transport can contribute to a more sustainable and resilient freight movement system. Calabria's geographical challenges may make diversification a complex task, but strategic investments and policies promoting intermodal transport solutions could help address these weaknesses.

Furthermore, the economic cost of maintaining and expanding road infrastructure, coupled with the potential environmental degradation, may indicate a need for a more balanced and sustainable approach. Investments in technology, logistics optimization, and infrastructure improvements, such as developing efficient intermodal terminals, could enhance the efficiency and environmental performance of the freight transport sector in Calabria.

Recognizing the potential structural weaknesses associated with environmental impact, air quality, and supply chain resilience, there is an opportunity for corrective measures. Strategic investments, policy interventions, and a shift towards more sustainable modes of transportation can transform the road freight sector into a more environmentally friendly and resilient component of Calabria's economic landscape.

Second, this part of the analysis shows disparities among LMAs. The variation in the number of employees across different LMAs highlights disparities in economic development within the region. Certain LMAs, like Cosenza, Lamezia Terme, and Cortona, exhibit higher employment rates in specific sectors, suggesting their relative strengths and potential for specialization. On the other hand, landlocked LMAs, such as Delianuova and Oppido Mamertina, face challenges in attracting employment opportunities in the Blue Growth sectors. Policymakers could focus on implementing targeted strategies to address these disparities and ensure more equitable economic growth across the region.

Yet, a positive aspect of the results is its emphasis on regional hubs and their significance. The presence of major economic centres in the region underscores their importance as strategic hubs for specific sectors. Reggio Calabria's focus on "Sea and Coastal Passenger Water Transport" and Gioia Tauro's prominence in "Other Transportation Support Activities" indicate their critical roles in facilitating maritime trade and related services. These hubs can serve as catalysts for regional economic development, attracting investments, promoting innovation, and fostering collaboration in BE.

Same points were highlighted in the number of establishments network. It indicates that the dominant sectors within the Blue Growth industries in Calabria for 2019 are "Freight transport by road" and "Engineering activities and related technical consultancy." These sectors exhibit the highest number of establishments. The results also highlight the influential LMAs of Crotone, Reggio Di Calabria, and Vibo Valentia, which possess the largest number of establishments. The presence of "Vibo Marina" in Vibo Valentia further emphasizes its importance as a significant industrial and commercial harbor, particularly for petrol distribution and fish selling. However, it is worth considering that despite Gioia Tauro's prominence in the employment of the "Other transportation support activities" sector, its number of establishments for that sector remains relatively low. Furthermore, the weaker sectors, such as "Inland passenger water transport" and "Sea and coastal freight water transport," indicate potential areas for improvement and development.

The examination of employment size reveals the significant contribution of Blue Growth industries to the region's overall economy, with nearly 900,000 people employed across almost 200,000 activities. This highlights the substantial employment opportunities and economic value generated by these sectors, representing approximately 3.5% of the region's employment rate and 8.5% of the total economy.

However, merely examining employment size alone does not capture the true potential and competitiveness of Calabria's Blue Growth industries. The analysis of specialization through the LQ method adds a crucial layer of insight by assessing the extent to which these industries have achieved a concentration of employment compared to the national average. It offers a nuanced perspective on the level of expertise, industrial focus, and relative competitiveness within the region.

By combining the findings from both analyses, a more comprehensive picture emerges. The overall specialization in these sectors falls short of the national average. The presence of a few highly specialized LMAs, such as Gioia Tauro and Rosarno, showcases the potential for targeted development and highlights the importance of factors like infrastructure and industry-specific advantages.

The combination of employment size and specialization analysis helps policymakers address disparities across LMAs. It allows for a targeted approach in addressing areas with low levels of specialization, identifying barriers or challenges hindering development, and designing interventions to promote specialization in those regions. Strategic investments in infrastructure, education, skills development, and innovation can help bridge the gap and support the growth of Blue Growth industries in Calabria.

Investments in infrastructure, including ports, transportation networks, and logistics facilities, can significantly contribute to attracting businesses and fostering specialization. Moreover, supportive policies should be implemented to encourage innovation, entrepreneurship, and collaboration among industry stakeholders.

The findings obtained from the analysis of the EOCIC measures of Location Quotient (LQ) in Calabria's Blue Growth industries offer valuable insights into the dynamics of employment contribution by different firm sizes.

Additionally, the observed stronger influence of large firms, as indicated by the Plant Beta value of 0.34, suggests that the specialization of certain LMAs in Calabria's Blue Growth industries is predominantly driven by the presence and activities of these larger entities. This highlights the importance of considering the strategic positioning and role of large firms in shaping the regional economy. Leveraging their resources, capabilities, and market power, large firms have the potential to drive innovation, create employment opportunities, and stimulate economic growth within the region.

Therefore, policy interventions aimed at supporting and fostering the growth of large firms should be carefully designed and implemented to enhance their positive impact on the local economy.
Furthermore, the Size Beta value of 0.62 underscores the significance of firm size in determining employment patterns within Calabria's Blue Growth industries. The larger the firm, the greater its capacity to generate employment and contribute to the overall economic output of the region. This finding suggests that efforts to attract and retain large firms should be a key focus of regional development strategies. Creating a business environment conducive to the growth of large firms, such as providing access to capital, infrastructure, skilled labour, and favourable regulatory frameworks, can help stimulate employment and foster economic vitality in Calabria.
It is noteworthy that the analysis at the national scale also revealed a similar size-driven trend, indicating that the influence of firm size on employment patterns is not unique to Calabria but is a characteristic of the broader Italian context.
The lower Plant Beta and Size Beta values at the LMA scale, compared to the national scale, indicate a relatively lower concentration of firms within Calabria's Blue Growth industries. This suggests a more dispersed distribution of firms across the region, which can have both positive and negative implications. On the positive side, a diverse distribution of firms can promote resilience and mitigate the risks associated with overreliance on a few dominant players. On the negative side, it may indicate challenges in achieving economies of scale and scope, as well as limitations in knowledge spillovers and collaboration among firms. Therefore, policies should aim to strike a balance between encouraging diversity and fostering collaboration and clustering among firms to maximize their collective impact on regional development.
Overall, these findings contribute to a better understanding of the interplay between firm size, concentration, and employment dynamics in Calabria's Blue Growth industries. They emphasize the need for targeted policies that take into account the specific characteristics and needs of different LMAs within the region. Such policies should aim to create an enabling environment for the growth of large firms, promote collaboration and knowledge exchange among firms, and address the challenges associated with dispersion and limited economies of scale.
The research findings offer a crucial starting point for MSP to effectively target and encourage the growth of these sectors. The research's identification of the region's potential complements MSP by providing valuable input and a clear understanding of the untapped opportunities in underrepresented sectors. By integrating the insights gained from the research, MSP can provide the actionable steps and strategies needed to foster the development of these sectors.
Through the previous analysis, a range of critical factors and opportunities within Calabria's Blue Growth industries, including economic disparities, population decline, sector integration, diversification, employment disparities, the role of large firms, and the balance between diversity and collaboration were identified. These findings serve as the groundwork for MSP to build upon.
MSP, as a strategic planning and coordination framework, can leverage the insights from the analysis to address these identified factors effectively. It provides the means to transform the research findings into actionable strategies and policies that can rectify economic imbalances, stimulate population growth, promote sector integration, diversify the economy, address employment disparities, engage large firms, and foster both diversity and collaboration. In this way, the research findings

become the blueprint that informs the design and execution of MSP within the Calabrian BE.

Building upon this understanding, the strategies analysis aims to establish a comprehensive understanding of strategies related to BE at multiple levels. The following part dives into the review of these strategies, which further enhance the understanding of how to promote sustainable growth and development in Calabria's Blue Growth industries.

The strategies analysis part of this study delves into a comprehensive examination of the nine selected strategies that closely align with the principles of BE and the overarching objectives of this research. These strategies have been carefully identified through a multi-criteria analysis, ensuring their strong relevance and potential impact on BE sectors.

Before delving into the strategies analysis conducted and the selection of nine strategies through a multi-criteria analysis, it is crucial to acknowledge a significant paradigm shift that occurred on 17th May 2021. The European Commission embraced a transformative change by transitioning from the concept of Blue Growth to that of a sustainable BE. This shift represents a fundamental reorientation towards a more holistic and environmentally conscious approach to harnessing the potential of our oceans and water bodies. This section explores the implications and significance of this pivotal transition, laying the groundwork for understanding the subsequent strategies within the context of this sustainable vision.

The shift from Blue Growth to a sustainable BE signifies a departure from traditional models of economic development, which focused primarily on the exploitation of marine resources for economic gains. Instead, this paradigm shift embraces a comprehensive and integrated approach that recognizes the intrinsic value of our oceans and seeks to ensure their sustainable use for generations to come. By placing environmental sustainability, social well-being, and economic prosperity at the forefront, this transition signals a commitment to balancing economic growth with the conservation and preservation of marine ecosystems.

This transition is informed by a growing recognition of the pressing challenges our oceans face, such as climate change, pollution, overfishing, and habitat destruction. These challenges underscore the urgency for a more sustainable and resilient approach to BE, one that encompasses a wide range of sectors, including maritime transport, fisheries, aquaculture, coastal tourism, renewable energy, and biotechnology. The shift towards a Sustainable BE aims to align these sectors with long-term ecological sustainability and societal well-being.

The European Commission's commitment to this transformative shift is reflected in its comprehensive policy framework that emphasizes sustainable practices, innovation, and cooperation. The framework encompasses various aspects, including ecosystem-based management, the circular economy, marine spatial planning, biodiversity conservation, and the integration of BE principles into broader regional and national strategies.

The shift towards a sustainable BE, as outlined in the communication on a new approach for a sustainable BE in the EU, aligns closely with the recognition of the importance of marine ecosystem services. A sustainable BE offers tangible opportunities for the creation of new jobs and businesses, with a focus on mitigating impacts on oceans and coasts and building a resilient economic model through innovation and a circular economy. In this context, businesses that utilize renewable resources, preserve marine ecosystems, reduce pollution, and enhance climate change

resilience will be incentivized, while others will be encouraged to reduce their environmental footprint.

For example, preserving and restoring coastal vegetation systems, such as tidal marshes, mangroves, and seagrasses, which accumulate "blue carbon" in their plants, soils, and sediments, can significantly contribute to the decarbonization targets of the European Green Deal. Moreover, the preservation of blue carbon sequestration is closely linked to the preservation of coastal biodiversity. Similarly, the design of artificial reefs, restoration of important sea-bed habitats (e.g., coral reefs, macroalgal forests), and the development of solutions to combat pollution and eutrophication are crucial for rebuilding biodiversity and enhancing the resilience of coastal and marine ecosystems. These activities can form part of a dedicated economic sector, promoting sustainable growth and development.

Furthermore, embracing a forward-looking, ecosystem-based management approach under EU legislation helps minimize adverse impacts on marine ecosystems resulting from fishing, mineral extraction, and other human activities.

To facilitate the transition to a sustainable BE, the Commission plans to release a stable methodology for integrating the concept of "natural capital" into economic decisions. This involves assessing and quantifying the economic value of marine ecosystem services, as well as evaluating the socio-economic costs and benefits derived from maintaining a healthy marine environment. Additionally, the Commission intends to invest further in modelling techniques to improve the monitoring of live ecosystems and fisheries resources across time and space. Furthermore, guidance will be provided on adopting an ecosystem-based approach to maritime spatial planning, promoting the multi-use of marine space by combining different activities in the same location, such as mariculture and offshore renewable energy systems.

In light of this pivotal transition, it becomes imperative to contextualize any discussion on strategies related to BE within the broader vision of a sustainable BE. The subsequent strategies analysis, informed by a rigorous multi-criteria analysis, takes into account the objectives and principles set forth by this sustainable vision.

Regarding the first level (European level) the strategies analysed (the European Green Deal, EU Biodiversity Strategy for 2030, Farm-to-Fork strategy, EU's circular economy action plan, Sustainable and Smart Mobility strategy, Offshore Renewable Energy Strategy, EU Hydrogen Strategy, Bioeconomy Strategy, and European Strategy for Data) hold significant importance in the development of coastal communities and the growth of their BE. These strategies provide a framework for harnessing the potential of coastal areas, promoting sustainable utilization of marine resources, and fostering economic growth while ensuring environmental sustainability. See figure 21 for a timeline map of an overview of the EU Blue-related strategies.

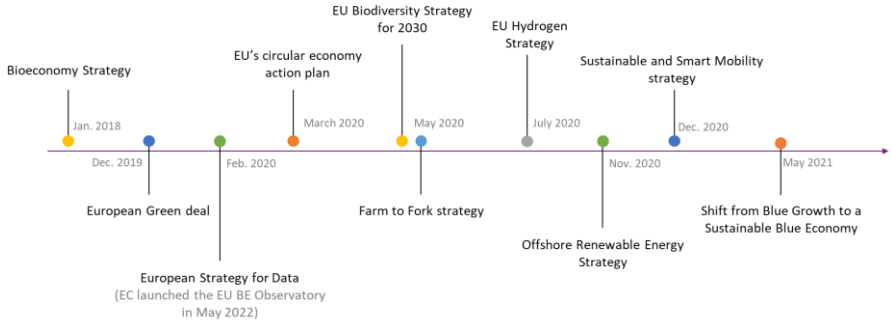


Fig. 21. Time-Stamped Blue Growth: EU Strategies Related to Blue Economy Mapped in Chronological Order

1. European Green Deal (EGD)

The European Commission announced the European Green Deal (EGD) in 2019 to address climate and environmental challenges, aiming to move the EU toward a resource-efficient, competitive economy that is fair and prosperous. Through EGD, the European Union aims to modernise its economy to be resource-efficient and competitive by reducing greenhouse gas emissions to zero by 2050 and decoupling economic growth from resource use without leaving anyone behind (European Commission, 2021f). EGD's plans are closely linked to BE agenda. For instance, the sustainable use of oceans, aquatic, and marine resources is an important aspect of the environmental challenges the EGD aims to address. Hence, BE has the potential to contribute significantly to the EGD objectives because of its diversity, dynamism, and innovation potential. Taking advantage of its unique environmental position, it offers high-quality jobs and prosperity while demonstrating that sustainable development is possible for coastal communities.

The most recent EU report on BE focuses on EGD and its potential to provide a path to a sustainable BE. Under that, there are related policies, actions, and initiatives to oceans such as the EU Biodiversity Strategy for 2030, the zero-pollution action plan, the sustainable BE Communication, ocean observation, Farm to Fork Strategy, and the circular economy.

In light of the European Green Deal, Itay is taking significant commitments with its PNRR to achieve sustainability policies at the national level.

The alignment between EGD and BE signifies a strategic synergy in addressing the pressing climate and environmental challenges. This collaboration not only fosters innovation and prosperity but also emphasizes the feasibility of sustainable development, particularly for coastal communities. It is imperative for nations like Italy to embrace this synergy. The harmonious integration of EGD and BE strategies not only promises a greener, more competitive economy but also paves the way for a truly sustainable future, ensuring that economic growth goes hand in hand with environmental stewardship.

2. EU Biodiversity Strategy for 2030

An integral part of the Green Deal is the new EU Biodiversity Strategy to 2030, published in May 2020 by the Commission. The goal of the new Biodiversity Strategy is to ensure that "Europe's biodiversity will be on the path to recovery by 2030" (European Commission, 2020b), which is in accordance with the 2030 Agenda for Sustainable

Development and Paris Agreement. The strategy is based on four pillars; 1) to protect nature,2) to restore nature, 3) to enable transformative change and 4) to set an ambitious Global Agenda (Naturachevale, 2020). Ocean ecosystem is an essential ecosystem for the well-being. Several economic activities depend on marine biodiversity, including fisheries, biotechnology, and tourism. Therefore, restoring degraded ocean ecosystems also offers economic opportunities.

The Strategy emphasizes the need for an ecosystem-based approach to managing human activities at sea in order to protect and restore marine ecosystems. As a result, Marine Protected Areas must be expanded and strictly protected areas must be set up for habitat protection and fish stock recovery. Among the topics discussed are overexploitation of fish stocks, reducing bycatch to protect certain species, and practices that damage the seabed.

Both the EU and its Member States have committed to enacting more than 100 specific actions by 2030 as part of the EU Biodiversity Strategy for 2030. These actions have been tracked through the EU Biodiversity Strategy Actions Tracker (*EU Biodiversity Strategy Actions Tracker*). By the time of this research, 34 of those have been completed, while 68 are in progress (7 of which are directly related to marine ecosystems).

One of the still-going actions that are related to marine ecosystems is the coordination with member states nature protection actions in the framework of the biogeographical regions and regional sea conventions. For instance, Natura 2000 in the Marine Environment and some actions under restoring marine ecosystems (European Commission).

Calabria has a project aimed at safeguarding Calabrian natural deposits that is funded by the European Community and is being considered one of the most important at the Community level, particularly in prevention. There are 847 georeferenced points on the map, which will be continuously monitored to verify variations and possible causes of degradation.

The commitment to enacting specific actions by 2030, with a significant focus on marine ecosystems, demonstrates a dedication to sustainable growth and environmental stewardship. Calabria's project, supported by the European Community, exemplifies the region's alignment with the European guidelines in safeguarding natural resources and contributing to the broader objectives of the EU Biodiversity Strategy.

3. Farm-to-Fork strategy

The current food production and consumption system is one of the major sources of carbon emissions, pollution, and biodiversity loss. In May 2020, The European Commission presented Farm to Fork (F2F) strategy as one of the critical elements of the European Green Deal. It focuses on identifying the inseparable links between healthy people, healthy societies, and a healthy planet in order to address the challenges of sustainable food systems. Through its farm-to-fork strategy, the Commission aims to make the system more sustainable, with a comprehensive approach that touches many aspects of BE. As an alternative to agriculture, responsible fishing can bring stocks to sustainable levels, and sustainable aquaculture can supplement the natural limits of wild captures.

F2F strategy is aligned with the 2030 EU biodiversity strategy. Both strategies work together to achieve a competitively sustainable future for nature, farmers, businesses, and consumers. With F2F strategy, we can build a food system that is fair, healthy, and

environmentally friendly. Together with other Green Deal strategies, it outlines initiatives on issues ranging from animal welfare to labeling. The farm-to-fork action plan includes initiatives on a sustainable food-labelling framework that will enable consumers to make informed choices.

According to the EGD, algae have the potential to be a sustainable food system in Europe and a global food security system. The F2F Strategy and other initiatives call for the EU to take action to make the best use of algae in Europe. According to the strategy, the European Commission will set out well-targeted support for the algae industry, as algae could become one of the most important sources of alternative protein for a sustainable food system and global food security.

The alignment of the F2F strategy with the EU Biodiversity Strategy for 2030 and the broader BE agenda highlights a powerful synergy in addressing the multifaceted challenges of sustainable food systems and marine resources. Integrating responsible fishing and sustainable aquaculture into the F2F strategy helps to work towards environmentally friendly food production and contribute to the preservation of marine ecosystems—a critical component of BE.

4. EU's circular economy action plan

When litter and waste are deposited in coastal areas, they can cause health risks and negatively impact the environment as well as human health. Nonetheless, these types of waste have potential economic value, since they can become sources of energy or recyclable materials that can be used again in a circular manner.

Even though many aspects and principles of the Circular Economy have been around since the 1970s, it was not until 2015 that the concept was officially introduced in the EU. Among the recent frameworks and regulations, the most significant is the new Circular Economy Action Plan (CEAP) adopted by the EU Commission in March 2020. The main objective of the program is to ensure that the European Union's economy remains competitive over the long term by decoupling economic growth from resource use.

The concept of Circular Economy is evidently linked to the BE sectors. In order to achieve a sustainable BE, economic activities need to reduce their impact on the coastal area and the entire marine environment. Single-use plastic products and fishing gear currently represent 70% of marine litter in the EU (European Commission, 2018b). In order to combat maritime pollution and implement circular BE strategies, the EU has put forward a number of initiatives. For instance, the Single-use Plastics Directive will strengthen Europe's commitment to keeping its seas clean.

According to the communication on the new approach for a sustainable BE in the EU, the commission will help reach a global agreement on plastics, which would lead to a more coordinated global response to plastic pollution. The EU Strategy for Plastics in a Circular Economy is on litter prevention from both land and sea-based sources. "It is the first EU-wide policy framework adopting a material specific life-cycle approach integrating design, use, re-use and recycling" (Addamo, A.,et al., 2022).

According to the PNRR report, Italy ranks above the EU average for investments in the circular economy sector and resource productivity. In 2017, Italy used 17.7 percent of circular material and recycled 49.8 percent of municipal waste, both higher than the EU average. Despite this, regional disparities are significant, and there are no national circular economy strategies (Italia Domani, 2020).

The Synthesis Report on circular economy in Italy for 2022 claimed that "the most relevant difficulties in the economy in Italy (as well as in other countries) are related to

policies that underestimated the potential and the strategic need for a robust reinforcement of circular economy in the country." (ECOMONDO, 2022).
To improve waste management and the circular economy, PNRR proposes investments and reforms to strengthen the infrastructure for separate collection, modernize or develop new waste treatment plants, and bridge the gap between northern and southern regions.
Bridging regional disparities and strengthening waste management infrastructure, as proposed in PNRR, enhances sustainability and also paves the way for Italy and hopefully Calabria to lead in circular economy practices. The integration of CEAP with BE safeguards coastal environments and fosters a resilient and prosperous future, where economic growth is in harmony with environmental stewardship.

5. Sustainable and Smart Mobility strategy

To make EU airports and ports cleaner according to the sustainable and smart mobility strategy, the commission plans to incentivize the deployment of renewable and low-carbon fuels and supply vessel and aircraft with renewable energy instead of fossil fuels. Maritime transport sector sustainability will be promoted through the implementation of the Sustainable and smart mobility strategy, published in December 2020. A number of concrete actions are included in the strategy for moving toward more sustainable modes of transportation, such as relocating road freight to inland waterways and short sea shipping (and rail) and improving intermodal transport. It is imperative to repurpose ports as multimodal mobility hubs, clean energy hubs for integrated electricity systems, hydrogen and low-carbon fuels, and circular economy testbeds.
As the world moves towards a decarbonized future, shipping will have to decarbonize as well. In order to achieve this goal, it will be necessary to achieve a dominant position for zero-emission ships by 2030 and to bridge the competitiveness gap between traditional fuels and sustainable fuels.
PNRR allocates a whole intervention just for the development of the port systems. It concerns reforms and investments in ports which are aimed at guaranteeing intermodality with the major European communication lines, developing connections with oceanic and Mediterranean traffic, and increasing the dynamism and the competitiveness of the Italian port system, with a view to reducing climate-changing emissions.
This strategy goes beyond marine and coastal domains. The part related to oceans and seas aims at zero pollution to air and water from shipping for the benefit of sea basins, coastal areas and ports. Zero-emission marine vessels are a key element to save the marine ecosystem and to have sustainable coastal areas. The strategy aims to make EU transport systems greener and more digital, as well as more resilient to future crises. The strategy is to be used in the Transportation sector, and in our case, in the Maritime Transport sector. It is intended for EU member states governments and regulatory bodies in the transportation sector. The strategy includes all dimensions of sustainability.
The ports and airports of Europe play an important role in international connectivity, the European economy, and the economies of their regions. To enable more sustainable forms of connectivity, airports and ports must adopt the best practices at zero-emission nodes. This will improve local air quality and benefit nearby residents' health. Clean energy hubs like inland and seaports could facilitate the integration of electricity systems, hydrogen fuels, and circular economy testbeds.

Applying the principles of Sustainable and Smart Mobility strategy and the ones for BE presents a significant opportunity for Italy to drive sustainable economic growth while preserving the environment. By promoting cleaner and more efficient transportation methods, particularly in maritime sectors, both strategies reinforce each other, fostering eco-friendly mobility and ensuring the vitality of coastal areas. Italy's proactive approach, evident in the PNRR's dedicated interventions in port system development, positions the country at the forefront of green transportation and that will enhance its global connectivity and competitiveness.

6. Offshore Renewable Energy Strategy

The European Commission published the Offshore Renewable Energy Strategy in November 2020 as part of the EGD roadmap. With an intermediate target of 60 GW by 2030, the strategy aims to deploy 300 GW of offshore wind energy by 2050, providing about 30% of the EU's future electricity (Addamo, A.,et al., 2022). According to the EU BE report for 2022, Europe currently leads the world in offshore wind manufacturing. However, the report shows that Italy is not one of the leading countries in this sector. Germany is the Member State with the largest installed capacity of offshore wind energy (47 %) followed by the Netherlands (23 %), Denmark (14 %), and Belgium (14 %).

The floating wind market in Italy is poised for growth, but new regulations and grid plans must be implemented quickly, developers said (N. Ford, 2022). Fossil fuels supplied 79 percent of Italy's primary energy in 2021 (figure 22). Natural gas was the most popular fossil fuel, accounting for 43 percent of the energy mix. In the second place, oil accounted for around 30 percent. Despite this, renewables accounted for less than 20% of Italy's total energy mix. The transition to renewable energy is imperative today, but there is still a long way to go before fossil fuels are completely replaced.

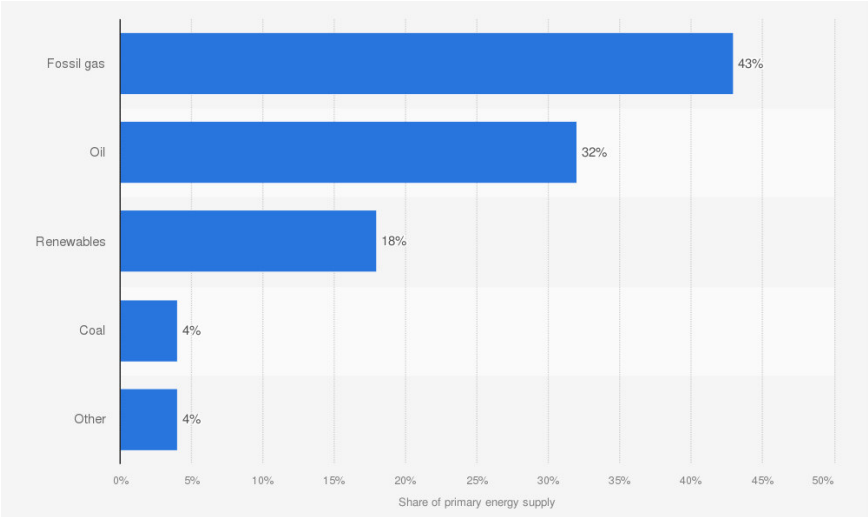


Fig. 22. Distribution of the total primary energy supply in Italy in 2021, by energy source.

Source: Statista Research Department (Statista, 2021a).

The potential growth of wind power in Italy is largely untapped, both on land and at sea. Several Italian companies, such as Falck Renewables and BlueFloat Energy, are developing growth plans. Six projects are being developed by these companies for almost 6 GW of capacity, including three in Sardinia waters for 2.4 GW, two in Puglia for 2.5 GW, and one in Calabria for 675 MW (N. Ford, 2022).

Italy launched the first wind farm in the Mediterranean (Beleolico wind farm) (Buljan, 2022). The offshore wind turbines were placed off the coast of Taranto in Italy for the first time in 2022 (Campbell, 2022). Taranto is a city in the south of Italy and only about 100 metres from the coast. At full capacity, the plant will contain 10 turbines with a total capacity of 30 MW, generating more than 58,000 MWh per year - enough to power 60,000 households. This will result in a reduction of 730,000 tonnes of CO_2 during its 25-year lifespan (Campbell, 2022).

Another local project was located in Reggio Calabria. NOEL laboratory at the Mediterranean University of Reggio Calabria has conducted an innovative experiment (Blue Growth Farm Project). Through the development of a multipurpose floating platform, the Blue Growth Farm will create advanced industrial knowledge, as well as provide a protected central pool to house an automated aquaculture system capable of producing high-quality fish, along with a large storage and deck area that can accommodate a commercial wind turbine with a capacity of 10 MW and wave energy converters (European Commission, 2021d). The prototype has shown successful results that are promising to guide the implementation of the full-scale infrastructure (NOEL, 2022).

To facilitate dialogue on the environmental, economic and social sustainability of offshore renewable energy, the Commission is ready to facilitate and promote a 'community of practice' where all stakeholders, industry, social partners, NGOs and scientists can exchange views, share experience and work on joint projects.

While Italy may not currently be a leader in offshore wind energy, the potential for growth in wind power, both on land and at sea, is substantial and largely untapped. The national initiatives demonstrate Italy's commitment to transitioning towards renewable energy and unlocking the vast potential of its coastal areas.

7. EU Hydrogen Strategy

Currently, offshore wind is the most advanced technology in the marine renewable energy market. Nevertheless, ocean energy (tidal and wave power, ocean thermal energy conversion, salinity gradient), floating solar photovoltaic (FPV), and offshore renewable hydrogen production are still in the early stages of development. There is a massive amount of molecular hydrogen being produced, which is used to synthesize ammonia for fertilizers, refine oil, and make methanol. During the production process, fossil fuels are used to generate energy to make it from natural gas. It is called grey or brown hydrogen. In recent years, researchers, companies, and governments have focused on the only option that can produce zero carbon dioxide emissions, namely green hydrogen. The feedstock used in this case is freshwater, which is electrolyzed with renewable electricity to produce hydrogen and oxygen. Presently, green hydrogen is at least three times more expensive than grey hydrogen, and electrolyzer technology cannot produce millions of tons of hydrogen each year.

Marine Renewable Energy is one of the BE emerging sectors which includes offshore hydrogen generation that offers significant potential for economic growth, sustainability transition, as well as employment creation (European Commission, 2020c). Renewable Energy Directive requires the EU to produce 40 percent of its energy from renewable sources (such as offshore and hydrogen) by 2030 (European Commission, 2021a). This goal should be contributed to by all Member States, and specific targets should be set for renewable energy use in transportation, heating, and cooling, buildings, and industry.

In 2020, the European Commission published the Hydrogen Strategy, which states the ambitious goal of building 40 GW of green hydrogen electrolysers by 2030. As a result of the Hydrogen Strategy and Offshore Renewable Energy Strategy, the framework has been created for developing offshore hydrogen generation alongside offshore wind parks or even hybrid renewable energy projects combining offshore wind, ocean power, and floating photovoltaic energy (Addamo, A.,et al., 2022). However, generating hydrogen as a clean source of energy could be costly. For decades, efforts have mostly failed since doing it well is too expensive, and doing it at a low-cost results in poor results.

Renewable hydrogen can be obtained via electrolysis using renewable electricity to split water into hydrogen and oxygen. In sectors with limited options and high costs, it will play a key role in decarbonizing. Hydrogen from renewable sources can be used for transport and industrial processes as well as for the production of green fertilizers and steel. Even if green hydrogen becomes market-competitive in about a decade, it is important to estimate how much electricity, land, and water it will consume.

According to the EU BE report, many countries such as Germany, Denmark, and the Netherlands, have been developing their plans to generate green hydrogen. Offshore green energy development extends beyond the North Sea and the Baltic. Within the Next Generation Europe plan, the sustainable production of hydrogen has become an investment priority following the release of the Hydrogen Strategy in 2020. In Italy's NRRP, €3.2 billion will be spent on research, testing, production, and use of hydrogen (Armatolis & Barbieri, 2021).

The Italian companies Saipem and Alboran signed a Memorandum of Understanding (MOU) for the development of five green hydrogen projects in the Mediterranean basin (3 in Italy, 1 in Albania, and 1 in Morocco) (SAIPEM, 2021). This initiative fits within the objectives set by PNRR.

While the green hydrogen sector is still emerging and faces cost challenges, it holds immense potential for carbon-free energy production and decarbonization efforts. The ambitious goal of building 40 GW of green hydrogen electrolysers by 2030, as outlined in the Hydrogen Strategy, sets the stage for offshore hydrogen generation alongside offshore wind parks and hybrid renewable energy projects. Italy's proactive approach, including significant investments in research, testing, and hydrogen production, as well as the national initiatives show the nation's commitment to this transformative sector. If the regions' plans align with these strategies, it is expected to result in enhanced inclusivity of southern regions, thereby stimulating their economic advancement.

8. Bioeconomy Strategy

Regarding BE sectors, Marine living resources sector is about renewable biological resources that are harvested, transformed into food and feed products (processing), and distributed along the supply chain. While Blue biotechnology explores marine organisms that have not traditionally been exploited commercially and their biomass applications. In other words, they include any economic activity associated with the use of renewable aquatic biological biomass, such as food additives, animal feeds, pharmaceuticals, cosmetics, energy, etc.

Algae (macro and micro), bacteria, fungi, and invertebrates are among the important marine resources included in the Blue Bioeconomy. Algae has the potential to contribute to a sustainable food system in Europe and global food security, as recognized in the EGD. A number of initiatives, such as the F2F Strategy and the

Bioeconomy Strategy, call for the EU to take action to make better use of algae in Europe.

Italy has the third largest bioeconomy in Europe (€330 billion annual turnover, 2 million employees), making it a core pillar of the national economy. There are about 7500 km of coastline in Italy, making it one of the longest in Europe. As a result, its sea-based resources—food, microbes, energy, materials, and landscapes—are remarkably rich (Fava et al., 2021). Across the entire BE sectors, which also includes transportation, shipbuilding, and tourism, about €45B is generated and 835,000 people are employed (*Italian Maritime Economy*, 2018). About 20% of these originate from fisheries and marine aquaculture, including the use of marine algae, microbes, enzymes, and biowaste from fishery and aquaculture product processing, as well as biomonitoring and bioremediation of contaminated marine water/sediment systems.

Among European countries, Italy ranks second in fish production and fourth in aquaculture production (European Commission & Directorate-General for Maritime Affairs and Fisheries, 2018). The majority of fish consumed in Italy, however, is imported. This is primarily driven by its citizens' eating habits, which favor a wider and often more "exotic" range of species (Fava et al., 2021).

The Italian bioeconomy relies on the national sectors that produce and transform biomass, including agriculture, livestock, forestry, fisheries, and aquaculture, as well as food and biobased industries. Its proven economic, environmental, and social importance in Italy places it within the strategic areas of smart specialization and innovation. The Italian government launched a tailored national strategy (BIT) in 2017, which was updated in 2019 (BIT II). The implementation of BIT II will be in synergy with the National Strategy for Sustainable Development of the Italian Government. In line with the revised European bioeconomy strategy published in 2018, this approach aligns with EU regulatory efforts focusing on energy, agriculture, forestry, and marine sectors.

In 2017 the Italian government developed a national Bioeconomy Strategy (BIT), which was recently updated (BIT II) in order to better interconnect the national bioeconomy's pillars: producing renewable biological resources, converting them into valuable food and feed, biobased products, and bioenergy, and transforming and valorizing biowaste streams. BIT II aims to improve coordination between ministries and Italian regions in terms of policies, regulations, research and development funding, and infrastructure investments.

Italy's substantial coastline, extensive sea-based resources, and significant presence in the maritime sectors position it as a key player in the intersection of these strategies. If the country integrats the sustainable utilization of marine living resources, such as algae, and promoting blue biotechnology, Italy can bolster its already impressive bioeconomy, which is a core pillar of its national economy.

9. European Strategy for Data

In February 2020, the European Commission released its Communication - European strategy for data - which outlines a plan to develop the data economy (European Commission, 2020d). It aims to create a single market for data that will increase Europe's global competitiveness and data sovereignty. A common European data space will enable more data to be used in the economy and society.

Regarding BE data, the European Commission launched the EU BE Observatory in May 2022 (European Commission, 2020e). It is a new knowledge dissemination platform for the sustainability of our oceans, seas, and coastal areas. This observatory will focus on socioeconomic aspects of maritime-related sectors. A detailed picture will be

presented of ocean-related activities, including the latest data, scientific evidence, market insight, and findings supporting current trends and developments in the EU BE. EU BE Observatory aims to fill the gaps in current data availability about ocean-related industries and sectors. With accurate, up-to-date scientific information, policymakers and businesses will be able to make informed decisions that will lead to the creation of a climate-neutral and sustainable BE for the EU. Additionally, the platform provides information relevant to implementing, monitoring, and developing policies, especially in light of the EGD.

The EU has been trying to drive forward sustainable solutions to maritime security problems. On 10 March 2023, the European Commission launched an update of the EU Maritime Security Strategy and its Action Plan. It is an opportunity to further enhance the EU's role internationally and further secure the EU's access to an increasingly contested maritime domain.

Overall, these strategies recognize the interconnections between different sectors and promote collaboration among stakeholders. Coastal communities are complex ecosystems that consist of various sectors and activities, and an integrated approach is crucial to their development. By taking a holistic view, these strategies maximize the potential of coastal resources and ensure that the development of one sector complements others, leading to a more balanced and sustainable BE.

One of the key aspects emphasized by these strategies is the sustainable utilization of marine resources. They promote responsible practices in resource extraction, processing, and distribution, ensuring the long-term availability of resources and protecting the ecological health of coastal ecosystems. This approach supports the livelihoods of local communities that depend on these resources, while also preserving biodiversity and ecosystem services.

The strategies also contribute to economic diversification in coastal communities. Traditionally reliant on sectors such as fishing and tourism, these communities can expand their economic base by tapping into emerging sectors of BE. By encouraging the development of sectors like blue biotechnology, offshore wind energy, or marine-based pharmaceuticals, these strategies reduce dependence on a single sector, enhance resilience to economic shocks, and create new employment opportunities.

Innovation and research are vital components of these strategies. They foster collaboration between academia, industry, and policymakers, driving the development of new technologies, processes, and business models. Innovation improves efficiency, cost-effectiveness, and sustainability across various sectors, unlocking new market opportunities and positioning coastal communities as centers of expertise and innovation in BE. Research and development efforts contribute to the generation of new knowledge, improving resource management practices and informing evidence-based decision-making.

Data-driven decision-making is another significant aspect highlighted by these strategies. The European Strategy for Data and the EU BE Observatory provide accurate and up-to-date data on ocean-related activities, market trends, and scientific insights. This information enables policymakers, businesses, and community stakeholders to make informed choices, enhancing the efficiency and effectiveness of resource allocation, identifying emerging opportunities, and supporting evidence-based policy development. Data-driven decision-making fosters transparency and accountability, building trust among stakeholders.

The strategies showed in the findings provide a comprehensive framework for the development of coastal communities and the growth of their BE. By adopting an

integrated approach, promoting sustainable resource utilization, encouraging economic diversification, fostering innovation, supporting data-driven decision-making, and prioritizing sustainability and resilience, these strategies empower coastal communities to unlock their full potential, enhance their prosperity, and secure a sustainable future.

On the national level, in Italy, the National Plan for Recovery and Resilience (PNRR – the Italian acronym) has emerged as a crucial instrument for stimulating the economy, addressing inequalities, and promoting sustainable growth. the Italian PNRR represents an important policy response to address specific challenges and stimulate economic growth and development in Italy. Within the context of this study, it is focused solely on the Italian PNRR in the national level to explore the intricacies and complexities of this particular plan, analyze its potential impacts, assess its alignment with international goals, and contribute to the ongoing discourse on effective recovery strategies and policies.

The PNRR was thoroughly examined to investigate the specific investments and reforms associated with BE. The aim was to assess the potential direct and indirect support provided by these investments and reforms in fostering the development of BE sectors.

PNRR encompasses a total of 134 investments and 64 reforms, out of which 13 investments and 8 reforms were identified as directly related to BE, as illustrated in Table 13. The cumulative financial support allocated to BE within the PNRR amounts to 22.22 billion euros, signifying that approximately 12% of the entire plan has been allocated to bolster Italian BE sectors. This substantial allocation underscores the significance and recognition of BE as a key driver of economic growth and sustainability in Italy.

Italy's national report on the economy of the sea also highlights several investments and reforms within the PNRR that have a direct bearing on the BE. However, this study went beyond the explicitly mentioned interventions and included additional investments and reforms that are believed to have a potential connection to BE, regardless of the strength of their linkage.

Figure 23 depicts four out of the six missions that were identified as highly pertinent to BE goals, along with the associated investments and reforms incorporated within these missions.

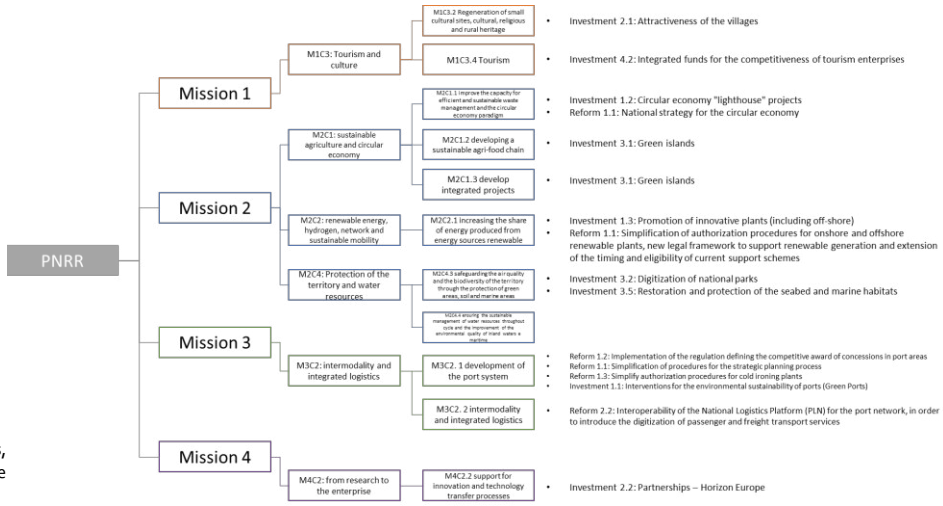


Fig. 23. PNRR Missions, Investments, and Reforms Driving National Blue Economy Goals.

Mission 1 and BG

First of all, PNRR puts digital transformation as one of its main components. This is a way to boost the competitiveness of the production system. Component 2 focuses on Digitalization, innovation, and competitiveness in the production system with funding of €23.89 billion. With funding of €13,380 million, the "Transition 4.0" intervention provides tax credits to promote the digital transformation of Italian businesses. The fund is available for investments in materials, training in digitisation, and cover tax credits for research, development, and innovation with a particular focus on SMEs.

Blue sectors were not explicitly mentioned in Mission 1, but it stressed the importance of strengthening innovation rates in the country's industrial and entrepreneurial fabric, as long with investing in cutting-edge technologies, research, development, and innovation, as well as digital and managerial skills. Particularly in infrastructure (transportation, electricity distribution, etc.). Based on these primes, this investment was categorized as having a weak connection to BG. The investment is not only targeted for BG sectors and/or priorities BG sectors.

Within the same mission, component 3 (Tourism and Culture) with a total fund of €6.68 billion, is divided into four areas of action: Cultural heritage for the next generation (€1.10 billion), Regeneration of small cultural sites, religious and rural cultural heritage (€2.72 billion), Cultural and creative industry 4.0 (€0.46 billion), and Tourism 4.0 (€2.40 billion).

A key component of Tourism 4.0 is the redeveloping, modernizing, and enhancing of tourism companies' digitalization. Three investments and one reform are included in this component. As far as BE is concerned, we selected investment 4.2 (Integrated funds for tourism enterprises' competitiveness). While Coastal Tourism was not mentioned in this intervention, it is still a part of the tourism sector, which makes it of medium relevance. It is important to make this investment, especially in light of the Covid-19 pandemic crisis, which has left the Italian tourism system with a series of unresolved issues. Competition in the tourism industry has consistently declined as a result of fragmentation in terms of quality standards, accommodation infrastructure, and innovation.

Mission 2 and BG

The second mission is devoted to the Green Revolution and the Ecological Transition. Four components make up the mission. Component 1; Sustainable agriculture and circular economy (€5.27 billion), component 2; Renewable energy, hydrogen, network, and sustainable mobility (€23.78 billion), component 3; Energy efficiency and redevelopment of buildings (€15.36 billion), and component 4; Protection of the territory and water resources (€15.05 billion).
Three of these four components are our focus. The goal of component 1 is to pursue a dual path for achieving complete environmental sustainability. On one hand, improve waste management and circular economies, improve separate collection infrastructure, build or renovate waste treatment plants, and bridge the gap between northern and southern regions (one million tons of waste are treated outside the origins today). On the other hand, developing a green supply chain for agricultural and food products, and reduces the environmental impact.
Component 1 has 3 interventions. Our focus is on M2C1.1: improving the capacity for efficient and sustainable waste management and the circular economy paradigm. This intervention included Investment 1.2: Circular economy "lighthouse" projects. Based on the EU action plan for the circular economy which introduces some specific recycling targets, the PNRR emphasized the importance of developing advanced technologies for plastic recycling, including marine litter. This investment was considered moderately related to BG.
In addition, Reform 1.1 calls for the development of a national circular economy strategy. As part of the new national circular economy strategy to be adopted by June 2022, eco-design, eco-products, BE, bio-economy, and critical raw materials will be integrated into the intervention areas, and tools, indicators, and monitoring systems will be used to evaluate progress toward achieving set targets. A medium related to BG is also included here.
Among the interventions in M2C1.2, there is Investment 2.1: Logistics development for the agri-food, fishing, aquaculture, forestry, floriculture, and nursery sectors. The plan involves different interventions in regard to logistics and the production of food. This implies that it would contribute to the Blue sectors like Marine living resources and seafood production and its distribution along the supply chain. The investment is not allocated directly to BG sectors; however, it is related to utilizing marine resources and being involved in its distribution.
Another intervention in the same mission is M2C1.3 Develop Integrated Projects which contains investment 3.1: Green islands. This investment focuses on the ecological transition of small islands. Probably this target is not linked directly to one of the BG sectors however it is linked indirectly to different sectors. For instance, Marine Renewable Energy and Ocean energy sectors for its aim to have plants for electricity production in these islands. Moreover, this investment has a link to the desalination sector since it targets the development of desalination systems. Moreover, it is also related to maritime transport, because part of the investment aims to upgrade infrastructure and services related to sustainable mobility. We believe that this investment is allocated directly to BG sectors.
Moving to the following component of the same Mission, M2C2.1 Increasing the share of energy produced from renewable sources. The component contains different investments and reforms that work for increasing the share of renewable energy. We in particular focus on investment 1.3: Promotion of innovative plants (including off-shore)

aims at supporting the creation of off-shore renewable energy generation systems. The investment is believed to be more targeted to Marine and Ocean energy.
Furthermore, reform 1.1: simplification of authorization procedures for onshore and offshore renewable plants, new legal framework to support renewable generation, and extension of the timing and eligibility of current support schemes. The reform has different objectives all revolving around renewable energy plants. Nevertheless, it has an objective that aims at simplification of procedures for the construction of offshore renewable energy generation plants.
Subsequently, we focus on component 4 of the same mission; M2C4 Protection of the territory and water resources. This component has 4 interventions. We selected investments in interventions 3 & 4. First, M2C4.3 safeguarding the air quality and the biodiversity of the territory through the protection of green areas, soil, and marine areas. Within this intervention, there is investment 3.5: Restoration and protection of the seabed and marine habitats.
This investment comes after the European Union's objective for biodiversity protection by 2030. It outlines large-scale interventions to restore and protect the seabed and marine habitats in Italian waters, to reverse the trend of degradation of Mediterranean ecosystems through increasing climate resilience, and support the maintenance and sustainability of activities essential not only for coastal areas but also for the country's essential production chains (fishing, tourism, food, blue growth). Furthermore, the investment aims to map seabed habitats and monitor the ecosystem so that effective protection measures can be developed. Thus, it is intended to strengthen the national research and observation system of marine and coastal ecosystems. The investment is allocated to only BG sectors.
According to our observations, all investments and reforms under M2C4.4 and M3C2.1 involve BG in some way. M2C4.4 ensuring the sustainable management of water resources throughout the cycle and the improvement of the environmental quality of inland waters and maritime. This intervention has 4 investments and 2 reforms. They all revolve around managing water resources. The biggest investment that accounts for almost half of the fund for this mission is about water infrastructure for water supply. As many Italian territories are characterized by fragmented and inefficient management of water resources, and poor effectiveness and capacity of the implementing bodies in the water sector especially in the South, it was essential to allocate this issue in the resilience plan for the nation.
Other investments are regarding irrigation and purification and sewage. As the Italian sewage and purification networks are most likely outdated or not always working especially in the south, they often do not comply with the European directives. Therefore, in this line of intervention, investments are planned to enhance the purification of wastewater discharged into inland and marine waters. The Nation is trying to do so through technological innovation.
As for reforms, they aim to simplify and better implement the legislation related to the National Plan for interventions in the water sector. Moreover, they aim at strengthening the industrialization process of the water sector and reducing the existing gap (water service divides) between the Centre-North and the South.

Mission 3 and BG

Mission 3: infrastructure for sustainable mobility. It has 2 components; M3C1: Investments in The Railway Network (24.77 billion) and M3C2: Intermodality and Integrated Logistics (0.63 billion). We focus on component 2, which has 2 interventions:

M3C2. 1 Development of The Port System and M3C2. 2 Intermodality and Integrated Logistics.
Regarding M3C2.1 "Development of the Port System", the intervention concerns reforms and investments in ports which are aimed at linking the Italian port system to oceans and Mediterranean traffic to increase its competitiveness and dynamism. These interventions will increase passenger and freight volumes. Meanwhile, they will create jobs both in port areas and inland, stimulating both local and national economic development.
Within M3C2. 2 "Intermodality and Integrated Logistics" we focus on Reform 2.2 "Interoperability of the National Logistics Platform (PLN) for the port network, in order to introduce the digitization of passenger and freight transport services". As part of the reform, the Port Community Systems, that is, the tool for digitizing the movement of passengers and goods of individual Port System Authorities will be interoperable so that they are compatible with each other and the National Logistics Platform.
Through the use of innovative technological solutions, the digitization of logistics systems, including airport systems, will play an important role in revitalizing these sectors, as it will improve the efficiency of the system and also reduce its environmental impact. There is therefore a transversal relationship between the intervention and M1C2's digitization mission.

Mission 4 and BG

M4C2.2 "Support for Innovation and Technology Transfer Processes" aims to enhance innovation propensities, encourage the systematic use of research results, and promote international collaboration. The objective of investment 2.2 "Partnerships – Horizon Europe" is to support research, development, and innovation projects within the framework of the Horizon Europe programme. Research and development initiatives can be an important catalyst for the country's relaunch and growth. There will be a particular focus on the following partnerships: 1) High-Performance Computing, 2) Key digital technologies, 3) Clean energy transition; 4) Blue oceans – A0020climate-neutral, sustainable, and productive BE; and 5) Innovative SMEs.
It is important to note that the 5th mission, which is about Inclusion and Cohesion, is not directly related to BE sectors but it plays a very important role in the pursuit of the objectives of the entire PNRR, for example, fighting against gender discrimination, increasing the employment prospects of young people, and territorial rebalancing and development of the South and internal areas.

In addition to PNRR, in July 2022, Italy entered into the EU Cohesion Policy Partnership Agreement for the 2021-2027 programming cycle. Under this agreement, Italy is set to receive a substantial allocation of EUR 75.3 billion in Structural and Investment (ESI) Funds, which includes both European resources and national co-financing. Notably, regions classified as less developed, such as Calabria, receive a significant share of these funds, along with other regions falling under the same category. This allocation aims to address regional disparities and promote inclusive development across the country.
The combined effects of the PNRR and the EU Cohesion Policy Partnership Agreement signify Italy's commitment to fostering sustainable development, economic resilience, and social cohesion. By strategically utilizing these funding mechanisms, Italy aims to leverage its strengths and address its challenges, particularly in coastal regions, where BE holds significant potential. The allocation of substantial financial resources, along with comprehensive investments and reforms, demonstrates Italy's determination to

unlock the full potential of its coastal communities and promote the growth of BE in a balanced and sustainable manner.

On the other hand, the regional analysis of strategies related to BE in Calabria for the period 2021-2027 demonstrates a comprehensive and integrated approach to promoting sustainable development in the region. The alignment of Calabria's strategic plan with the EU's Cohesion Policy objectives and the emphasis on the five policy objectives indicate a strong commitment to driving the transition to a sustainable BE. The prioritization of competitiveness, innovation, and sustainable development under the objective of a smarter Calabria highlights the importance of embracing the circular economy and technological advancements in BE.

The objective of a greener Calabria underscores the region's commitment to environmental sustainability and climate change adaptation. The focus on clean energy, green and blue investments, circular economy practices, and sustainable resource management aligns with the principles of BE. Prioritizing these initiatives can create a favourable environment for sustainable businesses and leverage its natural resources effectively in Calabria.

The objective of a more connected Calabria recognizes the critical role of connectivity in fostering the growth of BE. Investing in ICT connectivity, mobility, and energy systems enhances its infrastructure and support the development of smart transport and energy grids. These advancements are essential for improving logistics, enabling digital innovation, and facilitating the efficient operation of BE activities.

A more social Calabria objective emphasizes the importance of social inclusion and equal access to education, training, and work opportunities. Calabria aims to reduce inequalities and create an inclusive society by prioritizing employment, skill development, and regional big data platforms. This objective complements the sustainable development of BE by ensuring that its benefits reach all segments of the population.

Through a Calabria closer to citizens objective, it is highlighted the significance of local participation and engagement in regional development. There is no doubt that involving communities and local authorities can create a sense of ownership and foster innovative solutions that address local needs. The focus on regenerating urban spaces and enhancing cultural activities contributes to creating vibrant coastal areas that attract stable tourist flows, supporting the development of BE.

To sum, the regional analysis of strategies related to BE in Calabria demonstrates a comprehensive and integrated approach to sustainable development. The alignment with the EU's Cohesion Policy objectives and the emphasis on the five policy objectives indicate a strong commitment to driving the transition to a sustainable BE. Through prioritizing competitiveness, innovation, sustainability, connectivity, social inclusion, and local engagement, Calabria sets a solid foundation for the growth of BE and the overall well-being of its population. The successful implementation of the strategic plan and the collaboration between regional and local authorities and stakeholders will be crucial in realizing the full potential of BE in Calabria.

By first analysing the Calabria development plan, insights into the region's strategic objectives and priorities for both present and future economic advancement and sustainability were gained. Nevertheless, a retrospective examination of the blue projects outlined in the 2014-2020 plan was undertaken. This analysis aims to understand the types of projects that were previously implemented and to what extent changes have been made in the new plan. This comprehensive approach allows for the

identification of gaps, strengths, and areas for improvement in the implementation of BE strategies within the context of Calabria's overall development framework.

The analysis of Blue projects financed by the 2014-2020 cohesion policy in Calabria provides valuable insights into the initiatives implemented within BE sector. The findings reveal a diverse range of projects across different themes, reflecting varying levels of emphasis on BE in the region. However, it is important to note that the number of Blue projects identified in Calabria is relatively low, indicating a potential gap in the implementation of strategies to harness the economic potential of marine resources.

Among the themes analyzed, Research & innovation emerges as the most prominent, with 43 identified Blue projects. This theme highlights the region's focus on promoting innovative approaches and technologies in BE sector. It is encouraging to see significant efforts being made to advance research and development in this field, as it lays the foundation for sustainable and long-term growth.

On the other hand, the themes of ICT, Competitiveness of SMEs, Low-carbon economy, and Climate change adaptation and risk prevention demonstrate a comparatively lower presence of Blue projects in Calabria. These findings suggest that further attention and investment are needed to foster the development of these areas within BE sector. Strengthening the integration of information and communication technologies, promoting competitiveness among small and medium-sized enterprises, adopting low-carbon practices, and mitigating climate change risks are crucial for realizing the full potential of BE.

It is important to acknowledge that the analysis of Blue projects in Calabria is constrained by the limited availability of clear and comprehensive data. The lack of accurate and detailed information hampers our ability to provide a comprehensive assessment of the extent and impact of Blue initiatives in the region. Moreover, the classification and categorization of projects may be subject to errors and inconsistencies, further complicating the analysis.

Given the limited number of Blue projects identified and the challenges associated with data availability, it is evident that there is a need for improved data collection and reporting mechanisms. A more robust and standardized approach to data gathering and documentation would facilitate accurate analysis and enable a comprehensive evaluation of BE strategies in Calabria.

The findings regarding the analysis of Fisheries Local Action Groups (FLAGs) in Calabria reveal some important aspects. Due to limited available information, three out of four FLAGs were selected for analysis, emphasizing the need for improved data availability and transparency in the future. The research was conducted in the context of the 2014-2020 plan, as the new plans for 2021-2027 were not yet announced during the research period.

The actions outlined in the previous plan predominantly focused on fishing and fisheries, aligning with the objectives of the European Maritime and Fisheries Fund (EMFF), which aimed to support sustainable fishing practices, diversify coastal economies, create new jobs, and enhance the quality of life in coastal communities. However, the attention given to other sectors within BE was limited, likely due to the relatively recent emergence of the concept and the ongoing development of various sectors within it. The sectors were identified in the European Commission's BE Report 2018, indicating the growing recognition and importance of BE. Notably, the Partnership Agreement with Italy for 2021-2027 emphasizes the promotion of sustainable BE development through local partnerships, supporting a participatory model and territorial strategies aimed at leveraging the human, social, cultural, and

environmental resources of the communities involved. The agreement highlights the need to develop opportunities in various sectors such as fisheries, aquaculture, coastal tourism, blue biotechnology, ocean energy, maritime spatial planning, and regional sea basin strategies. It also emphasizes the integration of fisheries and aquaculture, promotion of sustainable tourism, and enhancement of cultural and natural resources associated with the aquatic environment. The findings underscore the importance of aligning the new plans for FLAGs in Calabria with the objectives outlined in the partnership agreement, ensuring a balanced distribution of attention across different sectors of BE.

Upon further exploration of FLAGs in Calabria, it became evident that the fishing sectors in the region are predominantly cantered around artisanal fishing practices. The projects initiated by FLAGs primarily revolve around the development and advancement of this particular sector. While BE encompasses various industries beyond fishing, it is crucial to acknowledge the significance of artisanal fishing within Calabria's fishing industry.

Therefore, supporting artisanal fisheries in Calabria is crucial for several reasons; first, their fishing methods tend to have a lower impact on marine ecosystems compared to industrial-scale fishing operations. Hence, supporting artisanal fisheries helps maintain the balance of the marine ecosystem by promoting sustainable fishing practices that minimize bycatch, habitat destruction, and overfishing. Second, artisanal fishing provides livelihoods for local fishermen and supports the local economy in Calabria. Supporting these small-scale fishing operations contribute to the economic sustainability of this coastal communities, helping to maintain jobs, income, and the overall economic well-being of the region. Third, artisanal fishing fosters a strong sense of community and social cohesion among fishermen and coastal communities. Supporting artisanal fisheries helps maintain these social networks, strengthens community bonds, and contributes to the overall social well-being of the region.

Indeed, BE encompasses a wide range of economic activities that utilize and depend on the sustainable use of marine resources. It extends beyond traditional fishing to include sectors such as coastal tourism, marine transportation, renewable energy, aquaculture, biotechnology, and ocean conservation. To maximize the potential of BE, it is necessary to strike a balance between supporting artisanal fishing practices and exploring opportunities for growth and innovation in other sectors. Recognizing the complexity of BE is vital because it emphasizes the interconnectedness of various sectors and highlights the importance of sustainable practices and resource management. This can be achieved through effective policies and initiatives that encourage sustainable practices, technological advancements, and the diversification of economic activities related to BE.

It is important to note that while the majority of actions outlined in the 2014-2020 FLAGs' plans cantered around fishing and fisheries, aligning with the objectives of the European Maritime and Fisheries Fund (EMFF), a critical perspective emerges regarding the absence of the fishing sector among the officially recognized Blue Growth economic sectors. Despite the crucial role of the fishing sector in the local economy and the support provided by FLAGs as community-led initiatives, official economic sector classifications have not accorded due recognition to this pivotal industry. Future plans must embrace a more comprehensive understanding of Blue Economy, considering the diverse opportunities across sectors, to ensure a balanced and inclusive approach to local development in Calabria.

The preservation and sustainable development of the blue sectors require comprehensive and well-designed strategies at all levels of governance. This entails the assessment and implementation of blue strategies on the European, national, regional, and local levels. The European level plays a crucial role in setting the overarching framework and policies that guide the sustainable management of marine resources and the promotion of BE sectors across member states. National governments are responsible for aligning their policies and regulations with European directives, while also tailoring strategies to their specific marine ecosystems and economic priorities. Regional authorities play a significant role in implementing and adapting blue strategies to local contexts, considering the unique characteristics and potential of their coastal areas. Finally, at the local level, communities and stakeholders have an essential role in actively participating in decision-making processes and implementing strategies that reflect their specific needs and aspirations.

To wrap up the multi-level strategies analysis, at the European level, the selected strategies such as the European Green Deal, EU Biodiversity Strategy for 2030, Farm-to-Fork strategy, EU's circular economy action plan, Sustainable and Smart Mobility strategy, Offshore Renewable Energy Strategy, EU Hydrogen Strategy, Bioeconomy Strategy, and European Strategy for Data provide a comprehensive framework for promoting sustainable practices and fostering the growth of BE. These strategies outline the overarching goals, targets, and initiatives for a sustainable and inclusive future in Europe.

At the national level, the implementation of these European strategies is reflected in the national policies and plans, particularly in the context of the National Recovery and Resilience Plans (PNRR) and the cohesion policy. These national-level strategies aim to align with the European objectives and allocate resources to support the transition towards a sustainable BE. They provide a roadmap for integrating the European strategies into the national context and addressing specific challenges and opportunities within the country.

Moving to the regional level, the analysis of 'Il futuro è Calabria –2021/2027 scenari e modelli' demonstrates how regional development plans and strategies align with the European and national frameworks. This regional-level strategy highlights the unique characteristics, challenges, and potential of Calabria in the context of BE. It provides a localized approach to implementing the broader European and national strategies, taking into account the specific socio-economic and environmental factors of the region.

At the local level, the focus on FLAGs further reinforces the alignment between European, national, and regional strategies. FLAGs serve as community-led initiatives that work towards the sustainable development of coastal areas, promoting activities related to fisheries, aquaculture, coastal tourism, and other sectors within BE. FLAGs contribute to the implementation of the broader strategies and ensure their relevance and effectiveness at the grassroots level.

The linkages between these levels are evident in the shared objectives, alignment of priorities, and coordination of actions. The European strategies provide a high-level framework, which is translated into national policies and plans. These national-level strategies, in turn, guide the regional development plans and strategies, while also considering the unique characteristics of the region. Finally, the implementation of these strategies is facilitated through local initiatives such as FLAGs, which connect the broader frameworks to the specific needs and opportunities at the local level.

This multi-level approach ensures a coherent and integrated approach to BE development, where strategies and actions are aligned and mutually reinforcing. It allows for the efficient use of resources, effective coordination among stakeholders, and maximized impact on local communities and the environment.

By aligning blue strategies at all levels, ensuring coordination and collaboration among stakeholders, and integrating scientific research, these governance structures can effectively promote the sustainable growth of BE while safeguarding the health and resilience of marine ecosystems.

As of right now, these strategies are still in the early stages. With the guidelines and funding proposed for the development of Calabria, it should be able to catch up with the rest of the developed regions in the country. One cannot expect the region to overcome all disparities that have existed for centuries within the frame of six years. Nevertheless, the programs and funds, as well as all the research that has been conducted in order to accelerate the economic development of the region, should enable it to take small steps that in the long run will lead to the desired outcome. Therefore, it is essential to obtain information about these strategies along the way and monitor their implementation.

The results show several new transition strategies that have emerged in the EU, Italy, and Calabria within the last few years. Different sectors of the marine economy have been affected by the pandemic in different ways, but all have been deeply affected. This called for stronger and more oriented strategies to meet both resilience and sustainability goals while achieving economic growth. This is an opportunity to start fresh and during the recovery, we should focus on sustainability and resilience rather than mere exploitation.

This study addressed the importance that has been given to BE in the recent few years and especially after the pandemic. In a sustainable BE, maritime and coastal activities contribute to economic growth, improved livelihoods, and social inclusion while fighting the climate crisis, protecting biodiversity and ecosystems, and using resources responsibly. However, the primary focus of this part of the analysis is to examine whether there are any deficiencies in strategies at the local and regional levels, with particular emphasis on one of the less developed regions. Taking into consideration that the local level plays a vital role in driving transformational development both nationally and internationally.

The role of MSP in this context is pivotal, as it acts as a connecting thread that harmonizes and integrates strategies across levels. It facilitates the translation of high-level European objectives into actionable, region-specific plans, allowing Calabria to maximize its utilization of EU funds while maintaining alignment with broader goals.

After conducting the different analysis in this research, a dashboard was developed to provide a visual representation of the findings. The dashboard serves as a tool to consolidate and present the data related to the strategies analysis in an accessible and user-friendly format.

It serves as a valuable decision-support tool, enabling policymakers and stakeholders to monitor the progress of BE strategies and make informed decisions based on the analysis of key dimensions. It promotes transparency, accountability, and evidence-based decision-making, facilitating effective policy implementation and resource allocation.

Integrating the strategies analysis and the dashboard helped to create a comprehensive framework that not only examines the strategies at different levels but also provides a visual representation of the key dimensions and dynamics within BE. This approach

enhances the understanding of the interrelationships between strategies, sectors, and performance indicators, enabling a more nuanced and informed approach to policy formulation and implementation.

The central themes and objectives of the thesis on coastal territories and the blue economy seamlessly aligns with the regional urban plan in Calabria outlined in section 1.4. Enshrined in the legal framework is a commitment to sustainable development, transparency, and citizen engagement, providing a robust foundation for responsible territorial development. This alignment becomes apparent as the legislation underscores the prudent utilization of environmental, natural, and historical-cultural resources—integral aspects emphasized in the thesis for effective economic development.

The regional plan's focus on planning, protection, and recuperation of the Calabrian territory mirrors the thesis's emphasis on responsible resource management and sustainable development. This collaborative approach, as encouraged by the regional plan, involving various entities, and emphasizing concertation among economic, social, and cultural forces, resonates with the thesis's recognition of the pivotal role played by local action groups and authorities in fostering economic development in coastal regions.

In addition, the legal framework actively promotes collaboration between different entities at various institutional levels, echoing the multi-level governance dynamics highlighted in the thesis. The commitment to efficient systems of territorial programming and planning, coupled with simplified administrative procedures in the regional plan, aligns with the thesis's call for tailored and context-specific approaches in the pursuit of sustainable development.

The exploration of Calabrian BE sectors in the thesis complements the regional plan, offering detailed insights into sectoral characterization and strategies at different levels. Both documents share common ground in recognizing the importance of collaboration, adherence to legal norms, and the promotion of economic activities. The regional plan, serving as a legal framework for territorial development, combines with the thesis to provide a comprehensive understanding of the potential for sustainable development in coastal territories.

The thesis's focus on community-based development to address economic underdevelopment finds resonance in the regional urban plan, categorized into naturalistic-environmental, settlement, and relational systems. This approach aligns with the thesis's emphasis on understanding the socio-economic and environmental context. The plan's emphasis on naturalistic-environmental preservation, settlement distinctions, and relational networks corresponds to the thesis's emphasis on proper resource management and tailored approaches for Blue Growth industries.

Moreover, both the thesis and the regional plan highlight the importance of balanced development and preservation of natural and cultural assets. The urban plan's delineation of institutional domains and the establishment of the Territorial Information System align with the thesis's emphasis on multi-level governance and data-driven decision-making.

Expanding to the Quadro Territoriale Regionale (QTR) within the regional urban plan, it provides a strategic framework for regional land planning, resonating with the thesis's focus on sustainable development in coastal regions. The QTR's emphasis on landscape and environmental values aligns with the thesis's call for balancing development with natural and cultural preservation.

The Provincial Territorial Coordination Plan (PTCP) and Municipal Structural Plan (PSC) bridge the gap between regional policies and municipal planning, aligning with the thesis's emphasis on coordinated efforts at different administrative levels. These documents provide guides for refining the regional knowledge framework and sustainable development.
The thesis complements the Municipal Structural Plan (PSC) by characterizing Blue Economy sectors, while the PSC's zoning regulations, risk assessments, and conditions for sustainability echo the thesis's holistic approach to coastal development. The collaborative dimension introduced by the Associative Structural Plan (PSA) aligns with the thesis's recognition of collaboration's importance at regional and local levels.
This overall alignment ensures a comprehensive understanding of potential regional development within the broader context of the blue economy.
While the research primarily focuses on economic and social aspects, the inclusion of the regional urban planning law in the first chapter is because all the economic and social aspects pertaining to urban territories are within the domain of urban planning. Urban planning decisions are not isolated from economic and social considerations; rather, they intricately influence and are influenced by these domains. Economic activities are often concentrated in urban areas, and the spatial organization determined by urban planning significantly impact the economic landscape. Moreover, social well-being is intricately connected to the quality of the built environment, access to amenities, and the overall structure of communities, all of which fall under the purview of urban planning.
The exploration of the regional urban planning law serves as a lens to understand how legal frameworks contribute to the broader context of economic and social development. Urban planning decisions can have profound implications for economic opportunities, influencing sectors such as commerce, housing, and infrastructure development. Simultaneously, the social fabric of communities is shaped by the spatial organization, accessibility, and inclusivity fostered through urban planning initiatives.
While the primary analytical focus of the research may be on economic and social parameters, acknowledging the interplay with urban planning enriches the investigation. It recognizes that economic and social outcomes are not isolated phenomena but are inherently intertwined with the spatial and legal frameworks that urban planning encapsulates. This holistic perspective ensures a more comprehensive understanding of the multifaceted factors shaping regional development.
Looking forward, the call for a broader set of parameters beyond economic metrics aligns with the aim of capturing the complexity of development processes and their impact on both economic prosperity and social well-being.

Limitations of the research

In the pursuit of a sustainable and prosperous future for Calabria, this research journey has uncovered critical insights into BE, community-based development, and the management of blue resources. However, despite the valuable insights gained from this research, several research gaps and limitations persist, offering opportunities for future studies to contribute to the ongoing efforts in this field.
Data availability is a primary constraint, encompassing issues related to data accuracy, comprehensiveness, and accessibility. Future research should aim to address these data gaps and improve the quality of available information.
Temporal considerations are also noteworthy limitations. The study's findings are based on data available up to a certain point in time, and conditions and policies may

have evolved since then. Researchers should consider how more recent developments may impact the research findings.

One significant aspect to consider is that the sectors involved in the blue economy, ranging from electricity transmission and production to marine fishing and manufacturing activities, form a complex web of interactions with the natural surroundings. While the economic development is crucial for the region, it is equally imperative to critically evaluate the environmental implications associated with these sectors.

It is essential to consider the potential disruption may be caused by various activities, such as power generation and manufacturing, to local ecosystems. The extraction of resources and manufacturing processes may lead to habitat disruption, pollution, and the release of pollutants into marine environments. This can have adverse effects on biodiversity, marine life, and the overall health of ecosystems. As the blue economy contributes to economic growth, it becomes crucial to balance this development with sustainable practices that safeguard the integrity of the environment.

Tourism-related activities, represented by travel agency operations, are also integral to the blue economy. However, the influx of tourists can exert considerable pressure on local ecosystems, contributing to issues like habitat degradation and increased waste. Sustainable tourism practices need to be emphasized to mitigate these environmental impacts and promote responsible visitation.

Fishing activities, both marine and freshwater, are vital components of the blue economy. However, overfishing, bycatch, and habitat destruction pose significant challenges to the sustainability of marine resources. Striking a balance between meeting economic needs and ensuring the long-term health of fisheries requires the adoption of sustainable fishing practices and effective resource management strategies. In the context of shipbuilding and associated maritime activities, the potential for environmental harm lies in noise pollution, habitat disruption, and the release of pollutants during construction. Future endeavours in these sectors should focus on adopting eco-friendly technologies and practices to minimize their ecological footprint.

To address these concerns comprehensively, future research should emphasize environmental assessments of blue economy sectors in Calabria. These assessments should go beyond economic metrics, considering factors such as ecological footprint, resource consumption, emissions, and waste generation. A holistic approach to the blue economy that integrates environmental sustainability is essential for fostering responsible economic development and preserving the rich marine ecosystems of Calabria for future generations.

Another limitation is the notable absence of the marine fishing sector in Calabria from official Blue Growth sector classifications raises critical concerns, revealing a significant gap in recognizing a crucial economic activity that is deeply intertwined with the local economy. This oversight not only contradicts the local reality but also has far-reaching implications for strategy development and the holistic understanding of the region's economic landscape.

Marine fishing plays a pivotal role in the livelihoods of coastal communities in Calabria, contributing to food security, employment, and cultural identity. The omission of this sector from Blue Growth classifications disregards its socioeconomic significance and undermines the effectiveness of strategy development. The failure to recognize the fishing sector may lead to misguided policy decisions, as the unique challenges and opportunities associated with marine fishing are overlooked.

The exclusion of marine fishing becomes particularly perplexing given the existence of Fisheries Local Action Groups (FLAGs) as community-led initiatives supporting this sector. FLAGs, designed to empower local communities and promote sustainable development, highlight the recognition of the importance of marine fishing at a grassroots level. The absence of marine fishing from official sector classifications, despite the existence of FLAGs, reflects a disconnect between local realities and broader economic strategies.

The implications of this data gap extend beyond the symbolic. Strategic planning for Blue Growth initiatives requires accurate and comprehensive data, and the exclusion of the fishing sector may result in an incomplete understanding of the region's economic potential. The failure to recognize the economic contributions of marine fishing hampers the ability to tailor policies that address the specific needs and challenges faced by the fishing communities in Calabria.

Furthermore, the absence of marine fishing in Blue Growth sectors may hinder the allocation of resources and funding for initiatives aimed at the sustainable development of the sector. This oversight perpetuates an imbalance in resource distribution, potentially favouring sectors officially recognized within Blue Growth classifications. As a result, the fishing communities in Calabria may be left without adequate support and investment, hindering their ability to adopt sustainable practices and contribute to the broader goals of a Sustainable Blue Economy.

The discrepancy between the local reality and the official economic sector classifications highlights a systemic issue in the recognition and representation of diverse economic activities. A critical examination of this gap is essential for fostering an inclusive and sustainable approach to Blue Growth in Calabria

The absence of marine fishing in Calabria's Blue Growth sectors is not just a data gap; it represents a critical oversight with implications for policy development and economic strategy. Recognizing the fishing sector within official classifications is imperative for a comprehensive understanding of the local economy, enabling tailored strategies that promote sustainability, support local communities, and contribute to the holistic goals of a Sustainable Blue Economy. Addressing this gap is essential for aligning regional strategies with the realities of Calabria's coastal communities and ensuring a more equitable and effective approach to Blue Growth initiatives.

Another point is that the effectiveness of policy implementation and its real-world impact is a complex process that may face unforeseen challenges. Future research can explore the practical aspects of policy implementation and stakeholder engagement.

It is essential to recognize the contextual specificity of the findings and proposed paradigm, which are tailored to the unique characteristics of Calabria. Future research should explore how similar approaches can be adapted to different coastal regions with their own specific socio-economic and environmental contexts.

Lastly, considering the variability in marine ecosystems influenced by factors like climate change and overfishing, future research should investigate how such variability could impact the long-term sustainability of BE initiatives.

Building on the comprehensive analysis of this research, the next step is to propose a new paradigm that will foster sustainable development in Calabria. This paradigm integrated the findings from the strategies analysis and address the unique challenges and opportunities of the region.

It is important to emphasize that proposing a new urban paradigm is an iterative process, requiring ongoing dialogue, collaboration, and engagement with various stakeholders. While the capability for solo implementation of the paradigm may be

limited, this research has the potential to inform and influence the decision-making process, thereby contributing to the advancement of urban regeneration theory and practice.

While sustainable and resilient practices, stakeholder engagement, leveraging coastal assets, improving infrastructure, and supportive policies for innovation and collaboration are essential components of any urban paradigm, it is worth noting that these elements should be inherent in any comprehensive urban development approach. Instead, the proposed paradigm will primarily focus on the case study's specific findings and data analysis. It aims to highlight the unique characteristics, challenges, and opportunities revealed through the research, providing a tailored framework that addresses the specific needs and nuances of the case study area. The subsequent section will present the proposed tailored paradigm for Calabria.

Blueprint for Sustainable Growth: A Comprehensive Paradigm for Calabria's Blue Economy Development

In light of the research findings and the unique challenges and opportunities identified in the case study, it is crucial to have a comprehensive paradigm proposed to guide the development of Calabria based on its potential and challenges. This paradigm builds upon the data-driven insights and research findings to develop a set of strategies, approaches, and actions that are specifically tailored to address the challenges and leverage the opportunities identified in the case study. It is important to note that while there has not been a specific focus on marine ecosystem services in the research conducted in Calabria, this concept is introduced into the new paradigm. Recognizing the intrinsic value of marine ecosystems and their critical role in supporting BE, safeguarding biodiversity, and mitigating climate change impacts becomes even more essential in this context. Additionally, this paradigm places a strong emphasis on the integration of marine ecosystem services with maritime spatial planning. The synergy between these two elements is pivotal in ensuring long-term environmental, social, and economic prosperity, while effectively addressing the identified challenges and opportunities.

With this context in mind, the following paradigm is now being put forward:

1. **Regional distribution and growth potential:** The significant disparity between Calabria's share of Blue Growth industries and the national average highlights the need to address the regional distribution and unlock the growth potential in the region. The development plan should aim to create an enabling environment for business development, including improving infrastructure, access to finance, and regulatory frameworks. It should also support the diversification of the Blue Growth industries by identifying emerging sectors and facilitating their growth.
2. **Addressing labor shortages and skills development:** The study revealed a labor shortage within the Blue Growth industries in Calabria. To overcome this challenge, the development plan should prioritize skills development programs and initiatives. This can include providing training opportunities, promoting entrepreneurship, attracting talent, and improving the attractiveness of careers in BE. Addressing the wage disparities and ensuring fair compensation for employees can also contribute to attracting and retaining skilled workforce.
3. **Addressing Disparities and Promoting Equitable Growth:** The variation in employment across different LMAs highlights disparities in economic

development within the region. Policymakers should implement targeted strategies to address these disparities and ensure more equitable growth across the region. This may involve providing support and incentives for underrepresented sectors in specific LMAs, fostering entrepreneurship and innovation, and promoting skills development and training programs.

4. **Strategic Hubs for Regional Development:** The presence of major economic centers, such as Reggio Calabria and Gioia Tauro, in the region indicates their importance as strategic hubs for specific sectors. These hubs can attract investments, promote innovation, and foster collaboration in BE. Policymakers should focus on enhancing the infrastructure, services, and business environment in these hubs to further catalyze regional economic development.
5. **Maximizing Comparative Advantages:** The analysis of employment size and specialization highlights the need to enhance specialization within Calabria's Blue Growth industries. Policymakers should focus on areas with high employment potential and concentrate resources on fostering specialization and should design and implement targeted interventions to enhance specialization in Blue Growth industries across different LMAs in Calabria. This can be achieved by capitalizing on Calabria's comparative advantages, such as geographical location, natural resources, and existing industry-specific strengths and involving strategic investments in infrastructure, education, skills development, and innovation. Targeted policies and initiatives should be developed to create a competitive environment that maximizes the potential of Calabria's BE.
6. **Integrated sectoral approach:** The development plan should emphasize the importance of an integrated sectoral approach, taking into account the interdependencies and linkages between different sectors within the Blue Growth industries. By understanding the complex social-ecological systems and cross-scale interactions, policymakers can develop strategies that promote synergies and minimize trade-offs between economic development and environmental conservation.
7. **Leveraging Key Sectors:** The analysis identifies the sectors of "Freight Transport by Road" and "Engineering Activities and Related Technical Consultancy" as central hubs in the economic network, indicating their crucial role in supporting the region's Blue Growth clusters. Policymakers and stakeholders should leverage the strengths of these sectors by improving infrastructure, optimizing logistics networks, and promoting sustainable transportation practices. This will contribute to the further development and expansion of BE in Calabria.
8. **Diversification and Development of Untapped Sectors:** The analysis reveals the absence of certain sectors, such as "Freshwater Fishing," "Marine Fishing," "Inland Passenger Water Transport," and "Support Activities for Petroleum and Natural Gas Extraction," in Calabria's BE. Policymakers should explore the reasons behind the absence of these sectors and assess their potential for development. This may involve conducting qualitative research to gain a comprehensive understanding of these sectors, identifying challenges and opportunities, and formulating policies and interventions to attract investment and promote growth in these untapped areas.

9. **Strengthening clusters and value chains:** Given the significant role of industry specialization and the size of economic activity in driving regional development, the development plan should focus on strengthening clusters and value chains within the Blue Growth industries. This can be achieved by supporting collaboration and knowledge sharing among companies, promoting innovation and technology transfer, and fostering partnerships between academia, industry, and government.
10. **Focus on Large Firms and Employment Generation:** Large firms play a crucial role in driving employment and economic output within Calabria's Blue Growth industries. Policymakers should focus on creating a business environment that is conducive to the growth of large firms. This can involve providing access to capital, infrastructure, skilled labor, and favorable regulatory frameworks. By attracting and retaining large firms, policymakers can stimulate employment generation and foster economic vitality in the region.
11. **Balance Between Diversity and Collaboration:** Policymakers should aim to strike a balance between promoting diversity and fostering collaboration among firms in Calabria's Blue Growth industries. While a diverse distribution of firms can promote resilience, efforts should be made to encourage collaboration, knowledge spillovers, and clustering among firms. This can be achieved through initiatives such as industry associations, collaborative research and development projects, and networking events.
12. **Promotion of Sustainable Fisheries and Aquaculture in Calabria:** The adoption of sustainable fishing and aquaculture practices tailored to the specific needs and challenges of Calabria should be strongly supported. The future strategies should encourage the implementation of science-based fisheries management approaches that consider the unique characteristics of Calabria's coastal waters. This includes setting catch limits, protecting important spawning grounds, and implementing measures to reduce bycatch and discards. Additionally, the paradigm promotes the development of sustainable aquaculture systems in Calabria, focusing on minimizing environmental impacts, ensuring high water quality, and prioritizing the welfare of farmed species.
13. **Leveraging Calabria's Coastal Assets for Responsible Blue Tourism and Coastal Recreation:** The paradigm should recognize Calabria's abundant coastal assets and aims to harness their potential through sustainable tourism practices. It should advocate for the development of responsible coastal tourism activities that prioritize the integrity of marine ecosystems and minimize resource consumption. By engaging local communities, the paradigm seeks to ensure that tourism initiatives benefit the region while preserving its unique natural heritage. Furthermore, the paradigm emphasizes the importance of creating accessible and inclusive recreational opportunities for both residents and visitors, guaranteeing equitable enjoyment of Calabria's coastal and marine environment.
14. **Advancing Understanding and Integration of Marine Ecosystem Services in Calabria:** This point should seek to promote the understanding and integration of Calabria's unique marine ecosystems,

emphasizing their importance for the region's well-being, sustainability, and growth. It should advocate for the establishment and effective management of protected areas to preserve biodiversity and ecosystem services. A holistic approach should be developed that combines research, analysis, and management to safeguard the ecological and socio-economic values of Calabria's coastal and marine environments.

Below is a tailored conceptual framework for ecosystem services assessment, specifically Calabria's marine ecosystems. This framework serves as a strategic roadmap for comprehensively assessing and quantifying the value of these ecosystems in economic, ecological, and societal terms, thus enabling informed decision-making and sustainable management practices.

This framework offers a structured approach for researchers and policymakers to understand and assess marine ecosystem services systematically in Calabria, but it could also be used in any other region. The proposed framework focuses on a spatial-economic analysis and social assessment to examine the trade-offs associated with different marine ecosystem services in the selected case study.

It comprises three main components: data collection, valuation methods, and stakeholder engagement. Data collection involves gathering biophysical , economic, and environmental data, while valuation methods encompass various approaches, including the System of Economic Environmental Accounts Ecosystem Accounting (SEEA-EA) framework, Total Economic Value (TEV) framework, and social assessment through interviews (see graph 24 for a roadmap of the analysis developed). The engagement of stakeholders, representing influential users, non-influential users, and context-setters, is integral to ensure that research and decision-making consider the diverse perspectives and interests of those connected to these services.

The framework is poised to provide critical insights into the intricate relationship between the health of marine ecosystems and the economic performance and welfare of the region. Quantifying the value of ecosystem services and comprehensively assessing their current state can guide strategies for sustainable management, inform policy development, and contribute to the overall well-being of the region.

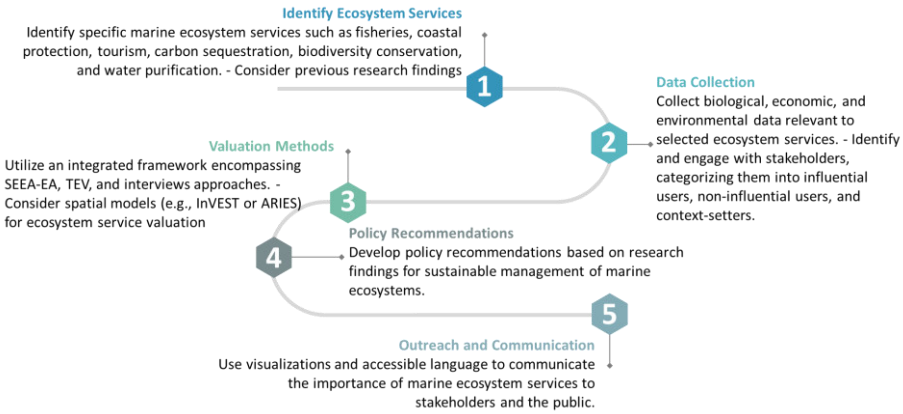


Fig. 24. A Roadmap for Ecosystem Services Assessment analysis Developed

It is essential to clarify that while this conceptual framework is introduced in this dissertation, it serves as a guide for future research endeavours in the realm of marine ecosystem services. The present work lays the foundation for in-depth investigations that can utilize the framework's components, allowing researchers to delve into specific aspects of BE in Calabria with more granularity. While this research touches upon the

framework's components, it is not the primary focus of the current dissertation but sets the stage for more comprehensive and specialized studies.
The Conceptual framework is as follows:

1. **Identify Ecosystem Services:** Starting by identifying the specific marine ecosystem services that wished to be studied, which depends on the case study and the availability of the data. These may include:
    a. Fisheries (commercial and recreational)
    b. Coastal protection (e.g., mangroves and coral reefs)
    c. Tourism and recreation
    d. Carbon sequestration
    e. Biodiversity conservation
    f. Water purification

A recent study conducted on knowledge clusters and gaps in terms of which ecosystem types, biodiversity components, or ecosystem service types that have been analysed showed that the majority of articles spanning from 1977 to July 2021 focused on provisioning services (68%), followed by regulation services (39%), and cultural services (18%) (Campagne et al., 2023). The study showed that food provision, particularly fisheries, was the most studied marine ecosystem services and mangroves were the most studied specific ecosystem, followed by tidal marshes and seagrass meadows.

2. **Data Collection:** The nature of the data and the specific information being gathered is contingent upon the key ecosystems present in the designated area of focus. This encompasses considerations such as the scope or extent to which these ecosystems spread, as well as their current ecological condition. This may include:
    a. Biophysical Data: Collecting data on the abundance and distribution of key species, such as fish populations, coral coverage, and mangrove density. This data may need collaboration with marine scientists.
    b. Economic Data: Gathering data on market prices, tourism revenues, and any other economic variables relevant to the chosen ecosystem services.
    c. Environmental Data: Obtaining data on environmental factors like water quality, sea level rise, and climate change impacts, which can affect the services provided by marine ecosystems.

Yet, for the social assessment, a data on/from locals are essential. However, who exactly are the users/beneficiaries of the selected services? Turkelboom et al. (2018) argue that it is crucial to identify stakeholders. The scholars grouped them into three categories: influential users (with decision-making influence and direct impacts - e.g., farmers, fishers), non-influential users (facing impacts but with little influence - e.g., tourists, recreationists), and context-setters (decision-makers without direct impacts - e.g., spatial planners, Governments, International bodies).

3. **Valuation Methods:** A group of Australian scholars have proposed an extended SEEA-EA framework, aiming to address the limitations of individual frameworks, integrates three distinct viewpoints regarding the value of coastal ecosystems to human societies; the SEEA-EA, TEV, and First Nations People (FNP) frameworks (De Valck et al., 2023). The framework presents a set of six steps, each aligned with key questions: "Where, What, Who, When, How much, and How important." (see figure 25). The aim here is to adopt these

steps in order to bring a more holistic and organized perspective, ensuring that the analysis thoroughly explores the various dimensions of marine ecosystems and makes informed decisions based on a comprehensive analysis. Nevertheless, the FNP will be substituted with semi-structured interviews. In addition to this framework, a spatial analysis component will be incorporated to map ecosystem distribution.

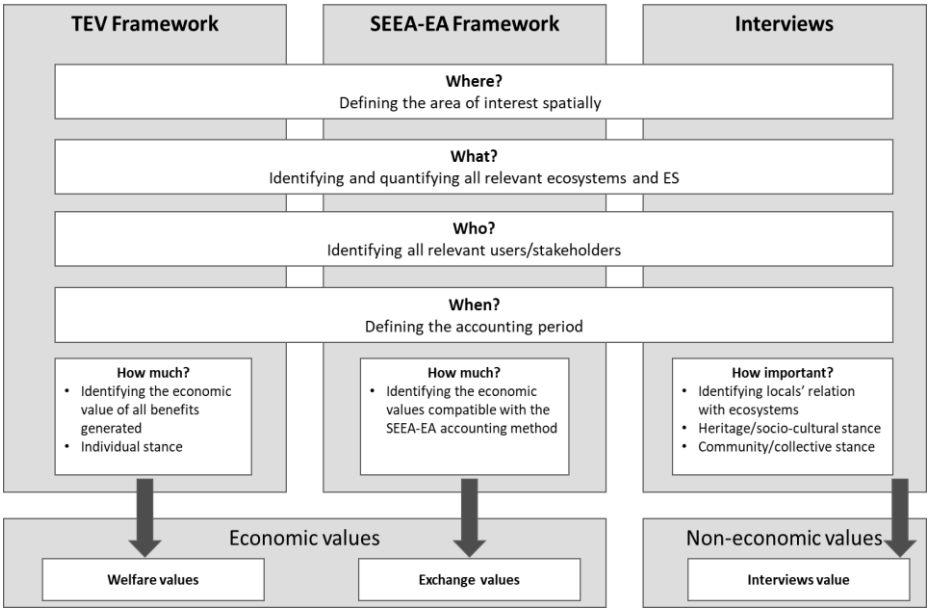


Fig. 25. Sequential Ecosystem assessment Process Following the Extended SEEA-EA Methodology by (De Valck et al., 2023) but with FNP Framework Substituted by Interviews

Source: (De Valck et al., 2023)

Economic: Total Economic Value (TEV) framework and SEEA-EA framework

First, SEEA-EA framework is widely accepted internationally, standardizes the processes for evaluating and valuing the extent, condition, and services of ecosystems. Ecosystem accounts within SEEA-EA consist of five interconnected stock and flow accounts. The first two accounts assess the current stock (extent and condition) of ecosystem assets at a specific point in time, measured in physical units. The next two accounts track the flow of ecosystem services provided by these assets during a given period, offering information on both the services themselves and their monetary value. The final account quantifies the monetary value of the ecosystem asset stock at the end of the period, representing the net present value of expected future service flows.

Second, TEV involves identifying various components that provide benefits to humans, summing up their economic values to estimate the total value of a natural resource. These components are typically categorized into use values, which relate to direct or indirect benefits from resource utilization, and non-use values, which can include potential future use, the existence of the ecosystem, benefits for future generations, and benefits for other individuals or communities.

Spatial: InVEST or ARIES tools

InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) and ARIES (Artificial Intelligence for Environment and Sustainability) aim to create marine models that can work together seamlessly, enhancing their accessibility for management purposes. InVEST assesses the value of coastal vegetation's carbon sequestration, aquaculture production, fisheries' economic worth, scenic viewing value, and the value of recreation and tourism visits to connect ecosystem services to monetary value. On

the other hand, ARIES focuses on employing compatible data and models to identify the often overlooked beneficiaries of ecosystem services (Oleson et al., 2020).

Social: Interviews

Interviewing local communities is essential in a social assessment of marine ecosystem service tradeoffs for several reasons: it taps into local knowledge, engages stakeholders, identifies priorities, offers contextual insights, gauges perceptions of benefits and costs, addresses conflicts, enables adaptive management, respects ethical considerations, and ensures inclusive and informed decision-making. The interviewees maybe will be asked the following questions: (1) what their relationship with the services is selected in the study; (2) what their relationship with these marine ecosystems is; (3) what solutions they would propose to the conflicts; and (4) what their estimated economic losses from are not having their marine ecosystems.

4. **Policy Recommendations:**

   Based on the findings, policy recommendations will be provided for sustainable management of marine ecosystems in the selected case study/s. This could include strategies for regulating fishing practices, promoting tourism, or conserving critical habitats.

5. **Outreach and Communication:**

   Using visualizations and accessible language to convey the importance of marine ecosystem services.

Expected Outputs:

- Comprehensive assessment of the current state of marine ecosystems in the case study.

  It is essential for informed decision-making, sustainable resource management, understanding economic and social implications, environmental conservation, and long-term planning. It is fundamental for achieving the goals of sustainable BE projects, ensuring responsible resource management, economic prosperity, and environmental protection in the studied region.
- Evaluation of the economic value of marine ecosystem services and their contribution to BE.

  Evaluating the economic value of marine ecosystem services is vital as it provides a quantifiable understanding of their economic benefits. This information informs business decisions, policy development, efficient resource allocation, and sustainable development in BE. It underscores the importance of preserving these ecosystems for long-term economic growth and public awareness.
- Insights into the relationship between marine ecosystem health and regional economic performance and welfare.

  The relationship between the health of marine ecosystems and economic performance of regional economies is crucial to sustainable growth, risk management, resource conservation, resilience, and informed policymaking. Enhancing the well-being of the region protects its economic sustainability and reduces risks.
- Scenarios and predictions for the future of marine ecosystems and BE in the case study under different policy scenarios.

This provide a framework for policymakers to understand the consequences of their choices and develop policies that support both economic prosperity and environmental well-being.

The reason for developing a conceptual framework specifically focused on ecosystem services, rather than addressing other points, lies in the critical importance of understanding and quantifying these services within the context of the research. These services play a pivotal role in guiding sustainable decision-making and resource management, especially when dealing with natural resources like marine ecosystems. Developing a specialized framework for ecosystem services allows for a more precise and in-depth assessment of their economic, ecological, and societal values, ensuring that these services are adequately recognized and integrated into decision-making processes. While this specific research may not have allowed for an in-depth assessment of these services due to time constraints, the framework was established to serve as a foundational guide for future endeavours.

Concluding remarks

In conclusion, the research on BE in Calabria has provided valuable insights into the region's economic dynamics and identified opportunities for sustainable development. Through various types of analysis, including the examination of industrial clusters, employment size, specialization, and the influence of firms, a comprehensive understanding of Calabria's Blue Growth industries has been achieved. Also, the multi-level strategies analysis underscores the significance of a coordinated approach in promoting sustainable practices and driving the growth of BE. It highlights the interconnectedness of European, national, regional, and local strategies in achieving common objectives. This holistic perspective ensures that BE can flourish sustainably, benefiting not only the broader European vision but also local communities and stakeholders engaged in coastal and marine activities.

This understanding has served as a foundation for formulating policies recommendations to enhance the region's economic potential and address existing challenges. The development of a dashboard has further facilitated data-driven decision-making, enabling policymakers and stakeholders to monitor progress and make informed choices. Moreover, the proposed paradigm, which emphasizes for instance the conservation and restoration of marine ecosystems, sustainable fisheries and aquaculture practices, and responsible blue tourism, holds great promise for the sustainable development of Calabria. By integrating these principles into urban regeneration efforts, the paradigm provides a tailored framework that addresses the unique needs and opportunities identified through the research. The Paradigm could help Calabria unlock the full potential of its BE while ensuring the preservation and sustainable use of its marine resources for the benefit of present and future generations.

In addition to the research findings and proposed paradigm, it is important to highlight the significant potential that Calabria holds in the field of BE. With approximately 10% of the Italian coastline located in Calabria, the region possesses a substantial advantage for BE initiatives. The coastal location of Calabria presents opportunities for the development of various blue biotechnologies related to marine activities in coastal zones. This includes the exploration and utilization of marine life resources, sustainable fishing practices, aquaculture, biomass production from aquatic plants and algae,

marine minerals extraction, marine renewable energy generation, and desalination processes.

The national report highlights the paradoxical situation in Italy's BE, where the southern regions play a substantial role in terms of territorial value, contributing significantly to the added value of the sea economy, as was section 2.6.1. showed. However, when analysed in absolute terms, the leadership predominantly lies with cities in the northern part of the country.

This discrepancy underscores the underdevelopment of territories within the southern regions including Calabria. The region, which, despite being part of the economically vibrant southern cohort, may not have fully harnessed its maritime resources compared to its northern counterparts. While the southern regions collectively boast a strong presence in BE, Calabria and specific areas within it might benefit from targeted strategies and investments to further unlock their maritime potential and contribute to Italy's overall BE growth.

The region also has the potential to enhance ecosystem services associated with marine resources, such as ensuring resource availability, providing habitat for marine life, offering coastal protection, addressing water pollution, and influencing climate change mitigation and biodiversity preservation. Furthermore, there is a need to foster the development of innovative and environmentally compatible materials and technologies for the marine extraction industry, shipbuilding chain, and naval industry. Capitalizing on these opportunities and leveraging its natural advantages can position itself as a key player in the sustainable and responsible utilization of marine resources, driving economic growth while ensuring the long-term health and resilience of its coastal ecosystems.

The shift from blue growth to a sustainable BE marks a critical turning point in understanding the crucial interplay between the environment and the economy. This new strategy recognizes the immense potential of BE in combatting climate change, biodiversity loss, and achieving sustainability goals. However, the adverse impacts of economic activities, such as pollution and climate change, pose significant challenges to the resilience of BE.

To facilitate the transition towards a sustainable BE, the Commission has recognized the need for a robust methodology that integrates the concept of "natural capital" into economic decision-making processes. This methodology involves assessing and quantifying the economic value of marine ecosystem services, while considering the associated socio-economic costs and benefits. By understanding the true worth of these services, policymakers and stakeholders can make informed choices that prioritize the health of the marine environment.

To achieve this, managing blue resources in a resilient and sustainable manner involves several key aspects. Firstly, it requires a thorough understanding of the value and vulnerability of marine ecosystems. Secondly, ecosystem-based approaches should be adopted, which means considering the impacts of economic activities on marine ecosystems and implementing sustainable fishing practices, protecting and restoring coastal habitats, and reducing pollution and waste. Furthermore, engaging local communities in the management and conservation of marine resources is crucial.

Additionally, MSP plays a crucial role in harmonizing human activities in maritime areas, aiming to balance the various interests and objectives of different sectors while ensuring the protection and enhancement of marine ecosystems and the services they provide. The EU's legal framework and support for MSP have positioned it as a global

leader in this field, facilitating cross-border cooperation and the growth of emerging sectors such as ocean energy and aquaculture.

MSP plays a significant role in the concept of sustainable BE, which emphasizes the sustainable and responsible development of marine sectors and resources. MSP acts as a strategic framework that helps balance the often-competing interests of various maritime activities, such as fisheries, aquaculture, shipping, tourism, and renewable energy, within a given maritime area. It enables sustainable, coordinated, and responsible economic development in maritime areas, supporting various sectors while protecting the marine environment.

Furthermore, MSP embraces an ecosystem-based approach, particularly in its more sustainable form. This approach recognizes the pivotal role of marine ecosystems in supporting economic activities. This ecological stewardship is crucial for the sustainable growth of marine sectors.

By pursuing these approaches, territories can enhance their resilience and sustainability. The effective management of marine ecosystem services and the integration of a community-based approach align with the broader goals of Agenda 2030 and other global approaches that emphasize the significance of BE in achieving sustainable development.

To wrap up, the analysis not only provides valuable insights into the Blue Growth sectors in Calabria but also serves as an essential first step in a series of more comprehensive examinations of Blue Growth patterns in the region. It lays the foundation for a data-driven, place-based structural analysis model, offering a practical framework for understanding the dynamics of Blue Growth and its potential in the area, with MSP emerging as a vital component in guiding and harmonizing these growth patterns.

The presence of natural resources, while significant, is not sufficient on its own to guarantee sustainable development. Effective and sustainable management of these resources is essential to harness their full potential and ensure that they contribute to the region's prosperity. Hence, territorial economic networks proposed in this project, when viewed through the lens of MSP, are a promising tool for comprehending the interactions within regional systems and economic clusters, shedding light on local industrial potentials, and paving the way for strategic planning and development initiatives. This analytical approach underscores the importance of understanding the economic landscape and identifying opportunities for growth and innovation through the coordination and regulation of activities in maritime areas.

Calabria, with its coastal areas and access to the Mediterranean Sea, possesses untapped potential for BE and sustainable development. With MSP as a guiding framework, this potential, when effectively harnessed, can drive economic growth, provide regulatory clarity, and ensure the responsible use of marine resources in the region.

The study's results offer a positive outlook for BE in Calabria's territories, signalling the potential for diversifying the economy and creating new job opportunities. This potential underscore the importance of strategic planning and sustainable resource management to unlock the region's economic prospects.

Incorporating sustainable resource management into urban planning, guided by MSP principles, enriches urban life, and ensures long-term prosperity. Integrating sustainable practices, preserving marine ecosystem services, and harmonizing various maritime activities can create vibrant and resilient communities that thrive in harmony with their natural surroundings. This approach promotes the well-being of current and

future generations while fostering a sustainable and prosperous future for the region through coordinated maritime spatial planning efforts.

References

Addamo, A.,et al. (2022). The EU blue economy report 2022. European Commission, Directorate-General for Maritime Affairs and Fisheries, Joint Research Centre.

Armaroli, N., & Barbieri, A. (2021). The hydrogen dilemma in Italy's energy transition. Nature Italy. https://doi.org/10.1038/d43978-021-00109-3

Buljan, A. (2022, April 22). First Mediterranean Offshore Wind Farm Up and Running in Italy. Offshore Wind. https://www.offshorewind.biz/2022/04/22/first-mediterranean-offshore-wind-farm-up-and-running-in-italy/

Burgess, M. G., Clemence, M., McDermott, G. R., Costello, C., & Gaines, S. D. (2018). Five rules for pragmatic blue growth. Marine Policy, 87, 331–339.

Campagne, C. S., Roy, L.-A., Langridge, J., Claudet, J., Mongruel, R., Beillouin, D., & Thiébaut, É. (2023). Existing evidence on the impact of changes in marine ecosystem structure and functioning on ecosystem service delivery: A systematic map. Environmental Evidence, 12(1), 13. https://doi.org/10.1186/s13750-023-00306-1

Campbell, M. (2022). Italy builds first offshore wind farm in an effort to move away from Russian gas | Euronews. https://www.euronews.com/green/2022/03/17/italy-builds-six-new-wind-farms-in-a-bid-to-move-away-from-russian-gas-dependency

De Valck, J., Jarvis, D., Coggan, A., Schirru, E., Pert, P., Graham, V., & Newlands, M. (2023). Valuing ecosystem services in complex coastal settings: An extended ecosystem accounting framework for improved decision-making. Marine Policy, 155, 105761.

ECOMONDO. (2022). Synthesis Report on circular economy in Italy. https://en.ecomondo.com/ecomondo/2022/ricerche-di-settore/eng/synthesis-report-on-circular-economy-in-italy-2022.pdf

EU Biodiversity Strategy Actions Tracker. (n.d.). https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/public/groups/in%20progress

European Commission. (n.d.). EU Biodiversity Strategy Actions Tracker. Retrieved 10 November 2023, from https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/

European Commission. (2007). Innovation clusters in Europe: A statistical analysis and overview of current policy support. Publications Office of the European Union. https://data.europa.eu/doi/10.2769/12579

European Commission. (2020a). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030 Bringing nature back into our lives. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX%3A52020DC0380

European Commission. (2021a). Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and

repealing Council Directive (EU) 2015/652. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0557

European Commission. (2018). Single-use plastics: New EU rules to reduce marine litter [Text]. European Commission - European Commission. https://ec.europa.eu/commission/presscorner/detail/en/MEMO_18_3909

European Commission. (2020b). 2020 Blue Economy Report [Text]. European Commission - European Commission. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_986

European Commission. (2020c). A European Strategy for data | Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/policies/strategy-data

European Commission. (2020d). A new Blue Economy Observatory to monitor and promote the sustainability of our ocean related activities. https://joint-research-centre.ec.europa.eu/jrc-news/new-blue-economy-observatory-monitor-and-promote-sustainability-our-ocean-related-activities-2022-05-19_en

European Commission. (2021b). The Blue Growth Farm. The European Maritime Spatial Planning Platform. https://maritime-spatial-planning.ec.europa.eu/projects/blue-growth-farm

European Commission. (2021c, July 14). The European Green Deal. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

European Commission, & Directorate-General for Maritime Affairs and Fisheries. (2018). Facts and figures on the common fisheries policy: Basic statistical data. https://data.europa.eu/doi/10.2771/294952

Fava, F., Gardossi, L., Brigidi, P., Morone, P., Carosi, D. A., & Lenzi, A. (2021). The bioeconomy in Italy and the new national strategy for a more competitive and sustainable country. New Biotechnology, 61, 124–136.

Ford, N. (2022). Italy set to spearhead floating wind in southern Europe | Reuters Events | Renewables. https://www.reutersevents.com/renewables/wind/italy-set-spearhead-floating-wind-southern-europe

Garland, M., Axon, S., Graziano, M., Morrissey, J., & Heidkamp, C. P. (2019). The blue economy: Identifying geographic concepts and sensitivities. Geography Compass, 13(7), e12445.

Italia Domani. (2020). Piano Nazionale Di Ripresa e Resilienza. https://www.governo.it/sites/governo.it/files/PNRR_3.pdf

Italian maritime economy. (2018). https://www.sr-m.it/wp-content/uploads/2018/06/summary-maritime-report-2018.pdf

Ketels, C. (2009). Clusters, cluster policy, and Swedish competitiveness in the global economy. Citeseer.

Naturachevale. (2020). The new EU Biodiversity Strategy for 2030. https://naturachevale.it/en/news/the-new-eu-biodiversity-strategy-for-2030/

Naumanen, M. (2019). European panorama of clusters and industrial change: Emerging industries: Driving strength in 10 cross-sectoral industries. European Commission EC.

NOEL, N. O. E. L. (2022). Conclusion of the Blue Growth Farm project. http://noel.unirc.it/news/conclusion-of-the-blue-growth-farm-project/

Oleson, K. L., Bagstad, K. J., Fezzi, C., Barnes, M. D., Donovan, M. K., Falinski, K. A., Gorospe, K. D., Htun, H., Lecky, J., & Villa, F. (2020). Linking land and sea through an ecological-economic model of coral reef recreation. Ecological Economics, 177, 106788.

Porter, M. (2003). The economic performance of regions. Regional Studies, 37(6–7), 549–578.

Porter, M. E., & Ketels, C. H. (2003). UK Competitiveness: Moving to the next stage.

SAIPEM. (2021). Saipem and Alboran Hydrogen together for green hydrogen production in Italy and in the Mediterranean | Saipem. https://www.saipem.com/en/media/press-releases/2021-03-04/saipem-and-alboran-hydrogen-together-green-hydrogen-production

Serrano, M. Á., Boguñá, M., & Vespignani, A. (2007). Patterns of dominant flows in the world trade web. Journal of Economic Interaction and Coordination, 2(2), 111–124.

Sölvell, Ö., Ketels, C., & Lindqvist, G. (2008). Industrial specialization and regional clusters in the ten new EU member states. Competitiveness Review: An International Business Journal.

Statista. (2021). Italy: Energy mix 2021. Statista. https://www.statista.com/statistics/873552/energy-mix-in-italy/

Turkelboom, F., Leone, M., Jacobs, S., Kelemen, E., García-Llorente, M., Baró, F., Termansen, M., Barton, D. N., Berry, P., & Stange, E. (2018). When we cannot have it all: Ecosystem services trade-offs in the context of spatial planning. Ecosystem Services, 29, 566–578.

6. Conclusion

Summary of the study

The research had explored the characterization of BE sectors in Calabria. It has attempted to highlight the regions' high-performance zones and sectors to help implement community-based development in one of the developing regions in order to address economic underdevelopment and vulnerability. The study focused specifically on Calabria region in Southern Italy, which has been historically disadvantaged and faced economic underdevelopment. The research was guided by the hypothesis that the presence of natural resources does not naturally contribute to the development if they are not properly managed. The objectives of this study encompass a comprehensive exploration of the Calabrian socioeconomic context, with a particular emphasis on BE and its associated industries in the region. Deep understanding of the economic landscape in Calabria, illumination of the distinctive characteristics of the Blue Growth sectors within the region, identification and analysis of various strategies related to BE across different levels, and assessment of the pivotal role played by local action groups in sustaining the community ecosystem are all sought. To facilitate data-driven decision-making and policy formulation, a dashboard analytical tool was developed to provide a holistic overview of Calabria's economic and environmental context. Ultimately, a pragmatic and tailored approach to address the challenges confronting BE in Calabria was aspired to, thereby fostering sustainable growth and prosperity in the region.

The research aim is to conduct a comprehensive analysis and ongoing monitoring of Calabria's BE potential. The ultimate goal is to identify ways in which the region can harness these opportunities to foster economic development. This involves leveraging their existing assets and adopting a community-based approach to resource management. The research aimed to answer one main question regarding the empowerment of local performance for a green and resilient transition and three sub-questions related to the potential of BE, the characterizations of Blue Growth industries, and the role of authorities at different levels in addressing marine complex systems and BE development.

The methodology employed in the research effectively addressed the research aim and its objectives. This analysis facilitates the alignment of economic opportunities with the specific needs of the region. It began by investigating the socioeconomic context of Calabria. To understand the region's context, data on economic indicators, population demographics, employment statistics, income levels, and other relevant socio-economic factors was gathered. This analysis helped identify the region's characteristics and disparities within the region. This step is crucial for the community-based interventions. Then, analysing inter-sectoral relationships and industry clusters to evaluate the economic potential of the region, in particular the Blue Growth industries.

Furthermore, the research outlined a methodology for analysing strategies related to BE at different levels. It prioritized strategies using multi-criteria analysis and subsequently identified links between strategies at all levels, providing a comprehensive network of approaches related to harnessing the potential of BE.

The research also explored BE investments and reforms outlined in the Italian National Recovery and Resilience Plan and examined initiatives at the regional and local levels. Additionally, it evaluated the role of local action groups in advancing BE and marine sectors. This contributes to the literature by providing a comprehensive evaluation of BE strategies at multiple levels. These strategies show the innovative solutions proposed by different governing levels to promote sustainable strategies and drive regional utilization of natural resources while aligning with sustainable development goals.

In addition to the empirical analysis, the research introduced an innovative approach for visualizing the complexity of a city with its interconnected subsystems. The spatial networks visualizing tool developed in this research provide valuable insights into the relationships, interactions, and dynamics within the economic sectoral networks in a spatial context. To dip into the specific details of this analysis, the subsequent answers to the research questions provide a more comprehensive understanding.

In order to answer the research's main question of how vulnerable territories can reinforce their local performance to achieve a transition towards green and resilience-based practices, the characterizations of a vulnerable coastal region were examined, and it was attempted to highlight its potentials. The analysis identified sectors, such as, Freight transport by road and Engineering activities and related technical consultancy, and local labour market areas, such as, Gioia Tauro and Cosenza, that could have a potential based on their high size and specialization compared to their counterparts. Highlighting the economic sectors and local labour market areas in vulnerable territories is essential for promoting economic development, targeted resource allocation, diversification, resilience, local empowerment, and attracting investment. It helps provide a roadmap for sustainable growth, fosters collaboration, and enables these territories to overcome economic challenges and unlock their full potential.

The project results described in chapter 5 also show that it is essential that regional strategies align with the national and European Strategies. Vulnerable territories should align their efforts with national and European strategies that promote sustainable practices and green transition. When objectives and priorities outlined in these strategies are integrated through a coordinated approach, territories can leverage available resources, funding, and support to leverage their local performance. Furthermore, the plans should extend beyond the regional level and encompass collaboration at the local level. Delving into finer granularity, the importance of self-sufficient territories was highlighted. There is no doubt that collaboration among regional and local authorities, stakeholders, and community members is essential for reinforcing local performance. A collaborative approach allows territories to share their knowledge, expertise, resources, and needs which helps in developing programs that address the specific challenges and opportunities within their respective regions. Accordingly, it empowers the localization of implementation strategies. With the collaboration, both regional and local levels of vulnerable territories should develop localized implementation plans that take into account their unique characteristics, challenges, and potential. These tailoring strategies and initiatives to their specific context, allows territories to maximize their impact on green transition and resilience-based regeneration, ensuring that actions are relevant and effective at the local level.

Additionally, the successful examples of FLAGs that were examined in the research show that involving local communities in decision-making processes and encouraging their active participation is crucial. Territories can engage community members through awareness campaigns, capacity building programs, and by creating platforms

for dialogue and collaboration. The empowerment and involvement of local communities can foster a sense of ownership and collective responsibility towards the sustainable transition of the community.

Further, and more importantly, vulnerable regions should identify and leverage their local resources, such as natural assets, traditional knowledge, and cultural heritage to drive resilience-based regeneration. Capitalizing on these resources can help territories develop sustainable and resilient economic activities, enhance local livelihoods, and preserve their unique identities.

It is imperative to maintain rigorous oversight of plan execution and institute long-term monitoring to ensure comprehensive follow-up. Regular monitoring and evaluation of progress are essential to track the effectiveness of strategies and initiatives. Territories should establish monitoring mechanisms with specific performance indicators and metrics to track progress effectively and assess their performance, identify gaps, and make necessary adjustments to ensure continuous improvement towards green transition and resilience-based regeneration. These approaches can help vulnerable territories achieve green transition and resilience-based regeneration, helping to build a more sustainable and resilient future.

Along with the main question, the research aimed to address three sub questions; Sub-question 1: Can Blue Economy drive a sustainable and inclusive transition in Calabria? Sub-question 2: What are the key characteristics and potentials within Calabria's Blue Growth industries? Sub-question 3: How do European, national, regional, and local authorities contribute to the development of marine complex systems and the Blue Economy which affect the development in Calabria?

First, BE plays a significant role in Italy's economy (European Commission et al., 2023), contributing to employment and economic value. However, the size of labour market related to Blue Growth industries in Calabria is relatively small compared to the rest of the country, as shown in table 10. Nevertheless, there is room for improvement in terms of specialization and concentration of these industries compared to the national average. Calabria possesses a wealth of untapped resources that can be utilized. With roughly 10% of Italy's coastline located in Calabria, the region enjoys a substantial advantage for BE initiatives. Its coastal location opens up opportunities for various blue biotechnologies related to marine activities, including sustainable fishing practices, aquaculture, marine biomass production, marine minerals extraction, renewable energy generation, and desalination processes. However, despite the southern regions, including Calabria, contributing significantly to Italy's sea economy, there is a notable disparity in absolute terms, with leadership predominantly concentrated in the northern regions. This suggests that there is a need for targeted strategies and investments which could further unlock the south maritime resources and bolster Italy's overall BE growth. Strategic interventions, such as investments in infrastructure, innovation, and collaboration, can help unlock the full potential of BE and promote sustainable and inclusive transition in Calabria.

Second, the analysis answered the second sub-question which identifies "Freight transport by road" and "Engineering activities and related technical consultancy" as the main sectors driving Blue Growth industries in Calabria. These sectors exhibit a high number of establishments and employment. However, there is a lack of information regarding sectors like "Freshwater Fishing," "Marine Fishing," "Inland Passenger Water Transport," and "Support Activities for Petroleum and Natural Gas Extraction," suggesting untapped potential or limitations in the region's BE. Lacking information and data regarding these sectors poses challenges understanding their contributions to

the local and national economy. Freshwater and marine fishing activities are known for generating income and employment opportunities for coastal communities. Inland passenger water transport provides efficient transportation services, supporting tourism, trade, and local economies. Support activities for petroleum and natural gas extraction contribute to energy production, export revenue, and associated industries. These sectors are interconnected with other industries, forming value chains and promoting economic linkages. Therefore, policymakers should explore the reasons behind the absence of these sectors in the open data resources and assess their development feasibility.

Regarding the role of European, national, regional, and local authorities in promoting BE development is of utmost importance as each level plays a significant role in addressing and advancing this economic sector. Their roles are interconnected and aligned through shared objectives, coordinated actions, and the translation of strategies from the European level to the national, regional, and local contexts. This multi-level approach ensures a coherent and integrated approach to BE development, maximizes the impact on local communities and the environment, and promotes the sustainable growth of BE while safeguarding marine ecosystems' health and resilience.

To elaborate, at the European level, selected strategies shown in chapter 5 provide a comprehensive framework for promoting sustainable practices and fostering the growth of BE. These strategies outline goals, targets, and initiatives for a sustainable and inclusive future in Europe.

While National authorities play a vital role by implementing these European strategies through national policies and plans. They align with the European objectives, allocate resources, and provide a roadmap for integrating the strategies into the national context. In the context of the National Recovery and Resilience Plans (PNRR) and cohesion policy, these national-level strategies address specific challenges and opportunities within the country.

Moving to the regional level, the new regional development plans and strategies align with the European and national frameworks. This regional-level strategy, as exemplified by the analysis of 'Il futuro è Calabria –2021/2027 scenari e modelli', highlights the unique characteristics, challenges, and potential of a specific region within BE context. It provides a localized approach to implementing the broader European and national strategies, considering the specific socio-economic and environmental factors of the region.

At the local level, Fisheries Local Action Groups (FLAGs) serve as community-led initiatives that reinforce the alignment between European, national, and regional strategies. Through engaging local stakeholders and leveraging local resources, FLAGs contribute to the implementation of the broader strategies and ensure their relevance and effectiveness at the grassroots level. However, the FLAGs in Calabria highlights the need for improved data availability and transparency. The research was conducted within the 2014-2020 plan context, which primarily focused on sustainable fishing practices. Other sectors within BE received limited attention, likely due to their emerging nature. The findings emphasize the need to align Calabria's FLAGs' new plans with the partnership agreement to address various BE sectors.

Also, the analysis on the role of European, national, regional, and local authorities in addressing marine complex systems and promoting BE development highlighted the institutional framework and governance mechanisms necessary for managing marine resources and fostering sustainable development. This contributes to a better understanding of the multi-level governance dynamics in the context of BE. The current

programs and strategies are intended to prosper all territorial levels with special attention to places that need more interventions. Less developed regions are offered a wide range of opportunities for citizens, as well as raising awareness about the results and impacts of cohesion policies on their territories. In the case of the Calabria Region, this would enhance the level of trust and reputation in the public administration, which is expected to be competent and efficient, fair and equitable. All implementation activities must follow the overall plan of regional cohesion policies for the new program's interventions to be successful.

These contributions add new insights and knowledge to the field by specifically focusing on the Calabria region and its potential for BE. By combining these analyses, the study contributes to a deeper understanding of how vulnerable territories can navigate the path toward sustainable and resilient development through the adoption of BE concept.

Overall, the study has contributed original knowledge to the field by providing a detailed analysis of the size, specialization, and influence of Blue Growth industries in Calabria. The research has shed light on the current state of BE sectors in the region. Despite being a coastal region surrounded by water on three sides, Calabria's Blue Growth industries are relatively small and not specialized compared to the rest of the country. Therefore, the study is meant to be a starting point to reveal the characteristics of the industries in the region to facilitate community-based development. Therefore, a clear image of the sectors and their relationships was shown, thus, establishing an oriented paradigm for a sustainable and inclusive transition through Blue Growth industries. Especially after the recent evolution of the COVID-19 global pandemic which has further increased uncertainty around future trajectories.

The research discusses the challenges and pressures that cities face in the present-day world. It highlights the need for effective management of subsystems within the city and the awareness of its resources and capabilities. It explores the potential of community-based development and the sustainable BE in addressing economic underdevelopment and vulnerability in Calabria. While the thesis primarily focuses on the economic aspects of regional development, there is a clear link between the research and the broader concept of ecosystem services, particularly in the context of marine ecosystems.

In this context, the research is closely linked to ecosystem services, with a specific focus on marine ecosystem services. These services are essential for human well-being and sustainable development. Marine ecosystems, including oceans, seas, and coastal areas, provide a wide range of ecosystem services. They play a crucial role in regulating the climate, generating oxygen, supporting biodiversity, providing food resources, supporting tourism and recreation, and supporting coastal protection, among other benefits. These marine ecosystem services are vital for the resilience and sustainability of coastal cities.

Recognizing the critical role of marine ecosystem services is paramount. These services provide invaluable contributions to various economic sectors, including fisheries, aquaculture, tourism, and biotechnology. They underpin the functioning and productivity of these sectors, making them economically viable and environmentally sustainable.

Focusing on BE and exploring strategies for sustainable blue resource management, it helped directly addressing the interdependencies and interactions between anthropogenic economic activities and marine ecosystems. It recognizes the need to effectively manage blue resources and promote a balanced approach that leverages

marine ecosystem services to achieve sustainable development goals and enhance the resilience of coastal cities. Additionally, the research promotes community-based approaches, self-sufficiency, and sustainability in the management of blue resources, acknowledging that sustainable development relies on leveraging local skills and resources while preserving ecosystem services for long-term well-being.

Harmonizing a Sustainable Blue Economy with Marine Ecosystem Services: A Vision Aligned with MSP Principles

In the pursuit of a sustainable and prosperous future for Calabria, this research journey embarked on a comprehensive exploration of BE, community-based development, and the management of blue resources. The multi-faceted analysis conducted has yielded valuable insights into the economic dynamics of the region and unveiled opportunities for transformative change. It is through these findings and their profound linkages with ecosystem services, particularly marine ecosystem services, that a deeper understanding of the intricate relationship between human endeavours and the natural world was gleaned.

At the heart of the discussion lies the recognition that economic growth, community well-being, and environmental preservation are inextricably intertwined. The concept of ecosystem services looms large when we talk about BE. These services, as provided by marine ecosystems, form the bedrock upon which our economic activities rest. From provisioning services that offer sustenance and livelihoods to regulating services that safeguard the climate and coastal areas, marine ecosystem services are the lifeblood of coastal communities.

In the context of Calabria's BE, there exists a notable disparity in our comprehension of the region's marine ecosystem services and their valuation. While there is an abundance of marine resources in Calabria, several knowledge gaps and challenges persist. These include an incomplete understanding of the precise contributions of various ecosystem services, limited data on the status of key species, and an inadequate valuation of these services in economic terms. Furthermore, the complex interactions between marine ecosystems and the regional economy are not fully elucidated. These knowledge gaps underscore the necessity for a structured approach.

Recognizing and quantifying ecosystem services are essential for the success of BE strategy, as they provide the foundation for sustainable development and enable a more comprehensive understanding of the complex relationships between economic activities and the marine environment. The European Commission, in its vision for a sustainable BE, emphasizes the need for an ecosystem-based approach to maritime spatial planning and the coexistence of various marine activities, such as mariculture and offshore renewable energy systems. To achieve a sustainable BE, it is crucial to leverage advanced knowledge of marine ecosystems, employ accurate monitoring tools, adhere to sustainable resource utilization practices, embrace ecosystem-based spatial planning, and implement nature-based solutions to address socio-economic and environmental challenges.

To address these critical gaps, the research proposed a conceptual framework tailored for the study of marine ecosystem services in the context of Calabria's BE.

The journey reveals that achieving a sustainable BE entails not just the responsible exploitation of marine resources but also their meticulous preservation. The sustainable future envisioned here is, in many ways, a reflection of the principles embodied in Maritime Spatial Planning (MSP). MSP, as a strategic planning tool, shares the goal of carefully managing the spatial distribution of activities in maritime areas,

promoting coherence among diverse sectors, and ensuring the sustainable management of marine areas. In the context of MSP, a delicate balance between economic development, community well-being, and environmental protection is sought, mirroring the vision articulated in your research conclusion.
From the shift to a sustainable BE emerges a vision of balanced coexistence where economic growth harmonizes with the well-being of marine ecosystems. It is a vision that embraces decarbonization, conservation, circular economy practices, and responsible food production as guiding principles, all of which are central to the principles of MSP. MSP's ecosystem-based approach aligns with the idea of responsible resource utilization and sustainable practices, thereby underscoring its crucial role in achieving the goals articulated in your research.
Within this context, the value of marine ecosystem services takes center stage. The economic potential, stability, and resilience of coastal cities, such as those in Calabria, are intricately tied to the health and sustainability of marine ecosystems. By acknowledging the value of these services, the coastal communities empower themselves to make informed decisions that prioritize the longevity of the marine environment, an essential aspect of MSP. The management and preservation of marine ecosystems, which are vital for the services they provide, are intrinsically aligned with the ecosystem-based approach promoted by MSP.
As this phase of research reaches its conclusion, a call for a sustainable BE, where marine ecosystem services are treasured as the most precious assets, is necessitated. This transformation demands a collective effort, with stakeholders from academia, government, industry, and local communities coming together to pioneer innovative strategies and initiatives, echoing the collaborative and integrated approach advocated by MSP.

Recommendations for future research

The topic of BE in Calabria offers a vast landscape for analysis and further research. There are numerous avenues to explore and work to be done in understanding and harnessing the potential of the region's blue resources for sustainable development. The characterization of specific sectors within BE, such as blue biotechnologies, marine renewable energy, and sustainable tourism, calls for in-depth analysis of their challenges and opportunities. Additionally, studying the environmental implications of BE activities are vital to ensure a comprehensive understanding of this complex system. Engaging local communities and stakeholders, conducting comparative analyses, and establishing long-term monitoring and evaluation mechanisms further contribute to a holistic understanding of BE in Calabria. With so many areas of research and analysis awaiting exploration, the topic holds significant promise for enhancing local performance towards a green transition and resilience-based regeneration.
For the future of this research, the empirical analysis presented here will be extended by the addition of qualitative and quantitative indicators on innovative behaviour in the estimation of the impact of absorptive capacity in the case of regional clusters as well as the economic valuation of ecosystem services and in particular marine ecosystem services. Assessing the sustainability of practices and technologies employed within BE sectors becomes paramount when considering factors such as resource depletion, pollution, and ecological degradation. Understanding the intricate connections between BE and marine ecosystem services is vital for the region's development. This analysis not only enhances our comprehension of the ecological implications but also informs the formulation of effective strategies for sustainable resource management.

Moreover, local ecological knowledge can provide a valuable means of accessing new data (Aswani et al., 2018). Local ecological knowledge (LEK) is highly important in the community-based development approach (Ballard et al., 2008). LEK refers to the knowledge and understanding that local communities have about their environment, ecosystems, and natural resources, which has been accumulated through generations of living in close proximity to nature (Titilola, 1990). Hence, if we value and integrate LEK in Calabria, community-based development may become more effective, context-specific, and sustainable, addressing the unique needs and aspirations of local communities. BE can create millions of new jobs, but it must be exploited and managed sustainably.

In the pursuit of a sustainable BE, there are several promising future research directions that can contribute to its success and long-term viability.

One pivotal area of investigation involves the enhanced valuation of marine ecosystem services. By delving deeper into the quantification and valuation of these services, researchers can provide policymakers and stakeholders with a more comprehensive understanding of the economic value they hold. This knowledge is crucial for making informed decisions that balance economic development with environmental preservation.

Effective policy implementation is another critical aspect that warrants further research attention. It is essential to explore the mechanisms and strategies for translating the principles of a sustainable BE into practical policies and actions. This will ensure that environmental preservation remains a priority alongside economic growth, fostering a harmonious coexistence between humans and the marine environment.

In the context of sustainable BE initiatives, local engagement and empowerment play a pivotal role. Investigating the role of local communities in ecosystem service management is essential. Researchers should focus on their active involvement, empowerment, and capacity building to ensure that these communities become active stewards of the marine environment.

The development of blue biotechnologies, sustainable aquaculture practices, and marine renewable energy solutions offers exciting opportunities for innovation within BE. Exploring these avenues can lead to the creation of new industries and jobs while promoting environmental sustainability.

Given the evolving challenges posed by climate change, it is imperative to investigate strategies for building climate resilience and adaptation into BE framework. This research should address how BE can adapt to changing environmental conditions while still fostering economic growth.

Lastly, comparative studies with other coastal regions and cities can provide valuable insights and best practices for sustainable BE development. By learning from the experiences of diverse regions, researchers can identify successful strategies and potential pitfalls, enabling more informed decision-making for the future of Calabria's BE.

Research queries are being suggested to delve deeper into the topic for additional exploration and study. These questions aim to explore different aspects of BE in Calabria and offer opportunities for gaining additional insights. Some of the future research questions could be as follows:

- What are the environmental impacts of BE activities in Calabria, and how can practices and technologies be optimized for sustainability and resource management?

- How can local communities and stakeholders be effectively engaged in the development and implementation of BE in Calabria, and how does their involvement contribute to inclusive and sustainable outcomes?
- How does Calabria's BE development compare to successful cases in other regions or countries, and what lessons can be learned from benchmarking against best practices?

These research questions can enhance our understanding of the impact and potential of BE in Calabria. The further analysis will provide a more comprehensive and nuanced perspective, facilitating the identification of strategies and approaches that can optimize environmental sustainability, inclusivity, and economic outcomes within the region.

BE is being viewed as a potential remedy for alleviating poverty and mitigating the decline in GDPs within nations. Using the sustainable BE approach in the right way that aims to respond to the natural resource use challenge in oceans by combining the aspects of economic growth and environmental sustainability could help lagging regions ramp up (Niiranen et al., 2018). BE concept tend to be highly malleable and adapt to the context in which they are being implemented. Therefore, the local context should drive its own scope of BE to foster its economic activity. It is essential to develop an approach that suits their own circumstances and objectives. This is where a high-level agreement of principles, goals, or/and strategies can assist in guiding the general direction and shared objectives of the BE, while also allowing for the details of implementation to be adapted to national contexts.

This research has taken a specific focus on Calabria due to its unique context and challenges. Although it is true that comparing Calabria to successful cases in other regions or countries could provide valuable insights, the aim is to deeply understand the local socioeconomic dynamics, blue resource potential, and the specific barriers and opportunities that exist within this region.

The concept of using single case studies with embedded units (Yin, 2009) offers a valuable opportunity to thoroughly analyze Calabria's unique challenges and opportunities. This approach allows for in-depth data analysis within the case itself, as well as cross-case analyses. The aim is to focus on the local context so that it can contribute to the understanding of regional development disparities and provide insights that are directly relevant and actionable for Calabria. The insights obtained from this focused study will be directly relevant and actionable for formulating tailored recommendations and strategies specific to the needs of Calabria.

The reason for focusing on Calabria as the only case study in the research goes back to the academic and political debates about the main determinants of the relative underdevelopment of the Southern regions can be found both in the recent and remote past. However, despite all the attempts to reduce this gap, it has somewhat been increasing. Economically, Mezzogiorno lags behind the national average and there is a limited number of vacancies and business opportunities that continue to cause out-migration and demographic decline. The region has been suffering from a partial understanding of the nature of the regional problem. Unfortunately, inadequate solutions in the past, coupled with neglect, have let these problems get out of control.

The research takes a targeted approach to contribute to the knowledge base specifically related to Calabria's sustainable BE and community-driven development. However, the findings and recommendations from this study can potentially inform future comparative studies and contribute to broader discussions on regional development, sustainability, and BE strategies.

The study revealed the need for tailored policies, not only for the Southern region but also for cities within it. The lag of Southern Italy cities can be overcome by having a multidisciplinary and place-based strategy. Those proposals should approach the geographic disadvantages, the weak industrialization, corruption, and the social backwardness. Moreover, enforcing the infrastructure to flourish logistics. This will bring more jobs to the Southern population and more jobs will increase household income. That will result in laying the foundation stone for the new industries in the region.

By implementing the findings and recommendations from this research, policymakers, stakeholders, and community members can work together to create a conducive environment for sustainable and resilient growth. Continued collaboration, knowledge sharing, and active community participation will be crucial in realizing the full potential of the region's blue resources.

The integration of community-based approaches and sustainable management of blue resources, as exemplified in the context of Calabria, presents a paradigm-shifting approach that holds immense promise for urban planners. The outcomes of this research provide urban planning professionals with a unique blueprint for creating cities that are economically vibrant, socially inclusive, environmentally sustainable, and resilient in the face of an array of challenges. Adopting the principles of the sustainable BE and community-driven strategies can help urban planners chart a course towards holistic urban development that not only bolsters economic growth but also nurtures social equity, environmental well-being, and community resilience. As cities worldwide grapple with ever-evolving urban issues, this research underscores the importance of incorporating the sustainable management of resources, derived from the marine environment or other local strengths, into urban planning frameworks. Such an approach not only enriches the quality of life for urban residents but also contributes to the long-term prosperity of urban areas, ensuring a more sustainable and resilient future.

References

Aswani, S., Lemahieu, A., & Sauer, W. H. (2018). Global trends of local ecological knowledge and future implications. PloS One, 13(4), e0195440.

Ballard, H. L., Fernandez-Gimenez, M. E., & Sturtevant, V. E. (2008). Integration of local ecological knowledge and conventional science: A study of seven community-based forestry organizations in the USA. Ecology and Society, 13(2).

European Commission, Directorate-General for Maritime Affairs and Fisheries, Joint Research Centre, Borriello, A., Calvo Santos, A., Ghiani, M., Guillén, J., Peralta Baptista, A., Petrucco, G., Pleguezuelo Alonso, M., Pattumelli, G., & Quatrini, S. (2023). The EU blue economy report 2023. Publications Office of the European Union. https://data.europa.eu/doi/10.2771/7151

Niiranen, S., Richter, A., Blenckner, T., Stige, L. C., Valman, M., & Eikeset, A.-M. (2018). Global connectivity and cross-scale interactions create uncertainty for Blue Growth of Arctic fisheries. Marine Policy, 87, 321–330.

Titilola, S. O. (1990). The economics of incorporating indigenous knowledge systems into agricultural development: A model and analytical framework. Technology and Social Change Program, Iowa State University.

Yin, R. K. (2009). Case study research: Design and methods (Vol. 5). sage.

Appendix

Appendix A. Strengths identified per analysed framework

Strategy	Short description	Relevance	Domain			Geographic scope	Level	User	Sustainability Dimensions				Sector
			Marine	Coastal	Broader than marine and coastal				Economic	Environmental	Social	Governance	
European Green Deal	A set of policy initiatives by the European Commission aimed at making the EU climate neutral by 2050.	The EGD calls for transforming the economic system and for it to happen, BE sectors need to be developed sustainably	✓	✓	✓	Global	National	EU	✓	✓	✓	✓	Cross-sectoral
EU Biodiversity	A long-term plan for preserving	The conservation	✓	✓	✓	Global	National	EU		✓			living resources

Strategy for 2030	nature and reversing ecosystem degradation.	and restoration of degraded marine ecosystems provide an economic opportunity for activities such as fisheries, biotechnology, and tourism.												
Offshore Renewable Energy Strategy	Addresses long-term offshore grid planning taking into account maritime spatial planning and hydrogen potential	It outlines the expected contribution of the marine renewable energy sector to the EU's ambition to achieve net zero emissions by 2050 by increasing offshore wind capacity in Europe.	✓	✓	✓	EU	Sectoral	Governments	✓	✓	✓	✓	Marine Renewable Energy, Ocean energy	

EU Hydrogen Strategy	With the EU hydrogen strategy, the EU plans to increase its ambitions to make renewable hydrogen the primary energy carrier of the future	Combined with the Offshore Renewable Energy Strategy, the Hydrogen Strategy creates the framework for offshore hydrogen generation, offshore wind parks, or hybrid projects combining ocean energy, offshore wind, and floating PV.	✓	✓	✓	EU	Sectoral	Governments	✓	✓	✓	✓	
European Strategy for Data			–	–	✓	EU	Sectoral	Governments, and knowledge institutes	✓	✓	✓	✓	Cross-sectoral

EU's circular economy action plan	It is intended to decouple economic growth from resource use, while maintaining EU competitiveness .	Circular BE strategies are essential for the shift to materialise and reduce lLitter and waste in coastal areas which can generate risks and affect both human health and the environment.	✓	✓	✓	Global	Sectoral	EU	✓	✓	✓	✓	Cross-sectoral
The EU Strategy for Plastics in a Circular Economy	It is the first EU-wide policy framework adopting a material specific life-cycle approach integrating design, use, re-use and recycling.	This will create opportunities for the collection of marine litter and the development of new port facilities to accept waste, separate it for collection,	✓	✓	✓	EU	Sectoral	EU	✓	✓	✓	✓	Cross-sectoral

		storage, and treatment.												
Single market strategy	It is a fair market with the unquestioned freedoms of movement of people, capital, goods, services and data.	It was pursued by parts of the EU fleet, mainly the small-scale fleets, to distribute and sell their products directly to consumers with the help of digital technologies (e.g. social networks) and sometimes through FLAGs.	–	–	✓	EU	Sectoral	Public and private sectors	✓	✓	✓	✓	Cross-sectoral
Farm-to-Fork strategy	It is central to the European Green Deal and aims to transform food systems into healthier, more	It highlights the potential of the EU aquaculture to accelerate the shift to sustainable	✓	✓	✓	EU	National, regional, local	Government	✓	✓	✓	✓	living resources

	environmentally friendly ones.	fish and seafood production											
EU Maritime Security Strategy (EUMSS)	It ensures the sustainability of the oceans, as well as respect for international rules and principles, while also protecting biodiversity.	It ensures effective ocean governance, protects oceans and seabeds, and unlocks the full potential of the sustainable BE.	–	–	✓	EU	National	Government	✓	✓	✓	✓	Maritime defence
Mediterranean Strategy for Sustainable Development 2016-2025	MSSD provides an integrative policy framework for all stakeholders to translate the 2030 Agenda and SDGs at the regional, sub-regional, national and local levels in the	In Italy, the Mediterranean Sea is partially intertwined, and this strategy aims to enhance a prosperous and peaceful Mediterranean region in which people	✓	✓	✓	Mediterranean region	regional, sub-regional, national and local levels	stakeholders	✓	✓	✓	✓	Cross-sectoral

	Mediterranean region.	enjoy a high standard of living and sustainable growth occurs within the capacity of natural ecosystems.												
Sustainable and Smart Mobility strategy	It aims to ensure that the EU transport sector is fit for a clean, digital and modern economy.	One of the strategy's flagship is creating zero-emission ports	✓	✓	✓	EU	Sectoral	Governments and maritime sector regulator s	✓	✓	✓	✓	Maritime Transport
Bioeconomy Strategy	Supports the creation of greener, more cost-effective industrial processes and the modernisation and strengthening of the EU's industrial base	This strategy covers land and marine ecosystems and the services they provide, as well as all primary production sectors that use and	✓	–	✓	EU	National, regional, local	Governments, private sector and consumers	✓	✓	–	–	Cross-sectoral

			produce biological resources (agriculture, forestry, fishing and aquaculture).											
Adriatic-Ionian Sea Strategy	It aims to reduce disparities in the Adriatic-Ionian macroregion by encouraging social, economic, and territorial cohesion.	This is strategy involove parts of Italy which includes all Calabria region.	–	–	✓	Adriatic and Ionian Region	National, regions	Governments	✓	–	✓	✓	Cross-sectoral	