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## **Blue funding of public policies - The case of the EEA Grants - Mário Ruivo Research Vessel Project**

Dissertation to obtain a Master's  
Degree in Law, in the specialty of  
Law and Economics of the Sea.

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## **ANTI-PLAGIARISM DECLARATION**

I declare that this thesis is the result of my personal and independent research, its content is original, and all sources consulted are duly mentioned in the text, in the notes and in the bibliography.

I further declare that this thesis has not been accepted by any other institution for any degree nor is it being submitted for a degree other than the one to which it relates.

Candidate

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## **MENTIONS**

Pursuant to the style rules in force at the NOVA School of Law, it's stated that the body of the dissertation, including notes and spaces, occupies a total of (84.923) characters.

To make it easier to observe the information contained in the graphs, they are available in the text of this document.

## DEDICATORY

Without support and assistance this thesis would not have been written. There's a popular African proverb that says, "It takes a whole village to educate a child," and I would say that this need persists throughout our educational journey. So, this space is dedicated to my loyal, dear, and special village.

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*“E ao imenso e possível oceano  
Ensinam estas quinas, que aqui vês,  
Que o mar com fim será grego ou romano:  
O mar sem fim é português”.*

Fernando Pessoa, 1922.

## ABSTRACT

More than 70% of Earth's surface is covered by the ocean. It is this ocean that sustains the life and well-being of the entire planet, not only because of the diverse ecosystem that feeds and protects the earth, but also because it serves as a transportation route for most of the goods and services that supply the planet. The way the society organized itself, the ocean became indispensable for the global economy, representing a global social and economic impact. Given this importance, specialists are increasingly alerting to the need for a more sustainable approach to the use of the ocean, in order to minimize the risks in which the ocean is exposed on a daily basis. From this concern was born the idea of the “Blue Economy”.

This dissertation researched one specific fund related to the Blue Economy: the EEA Grants. The EEA Grants is a growth program funded by Iceland, Liechtenstein and Norway with the aim of reducing social and economic disparities in Europe. The work was focused on Mário Ruivo Research Vessel and its project specificities. The work analyzed the project from the conception funding until the cost structure of nowadays, when the vessel is operating. In the end of the dissertation, the results were analyzed in order to better understand the profits and losses of the Mário Ruivo Research Vessel project, funded by the EEA Grants.

**Keywords:** Sustainability, Blue Economy, EEA Grants, Mário Ruivo Research Vessel, *Mar Portugal*, public funding, public policies, blue funding.

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## **ABBREVIATIONS**

ADB - Asian Development Bank

ADCP - Acoustic Doppler Current Profiler

ADCP - Acoustic Doppler Current Profilers

ASEAN - Association of Southeast Asian Nations

CCMAR - Centre of Marine Science

CF - Cohesion Fund

CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental

COSME - Competitiveness of Enterprises and Small and Medium-sized Enterprises

CPLP - Comunidade dos Países de Língua Portuguesa

CSR - Country-Specific Recommendations

CSTP - Committee on Science and Technology Policy

DGPC - Direção-Geral do Património Cultural

DGPM - Direção-Geral de Política do Mar

DIAS - Dublin Institute for Advanced Studies

DP - Dynamic Positioning

EAFRD - European Agricultural Fund for Rural Development

EAFRD - European Agricultural Fund for Rural Development

EEA - European Economic Area

EEA Grants - European Economy Area Financial Mechanisms

EEMF - Financial Mechanism of the European Economic Area

EEZ - Exclusive Economic Zones

EFF - European Fisheries Funds

EFSI - European Fund for Strategic Investments

EFTA - European Free Trade Association

EFTA - European Free Trade Association

EMEPC - Extension of the Continental Shelf

EMFF - European Maritime and Fisheries Fund

ERC - European Research Council

ERDF - European Regional Development Fund

ERDF - European Regional Development Fund

ERIC - European Research Infrastructure Consortium

ESF - European Social Fund

ESI - European Structural and Investment Funds

ESIF - European Structural and Investment Funds

EU - European Union

EUR - Euro

FBR - Fund for Bilateral Relations

FMC - Financial Mechanism Committee

FMC - Financial Mechanism Committee

FMO - Financial Mechanism Office

FMO - Financial Mechanism Office

GBRMP - Great Barrier Reef Marine Park Authority

GBRMP - Great Barrier Reef zoning plan

GEF - Global Environment Facility

GEOMAR - Helmholtz Centre for Ocean Research Kiel

GFZ - Alfred Wegener Institute, University of Potsdam, Helmholtz Centre Potsdam

HME - Hull Mounted Equipment

ICT - Information and Communication Technology

ICZM - Integrated Coastal Zone Management

IDL - Instituto Dom Luiz

IGC - Instituto Gulbenkian de Ciência

INESC TEC - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa

INTERREG - Interreg Programmes

IOC - Intergovernmental Oceanographic Commission

IPMA - Instituto Português do Mar e da Atmosfera

ISEL - Instituto Superior de Engenharia de Lisboa

ISEP - Instituto Superior de Engenharia do Porto:

ITI - Integrated Territorial Investments

JCBF - Joint Bilateral Funds Committee

LDC - Least Developed Countries

MAREANO - Marine areal database for Norwegian waters

MARXAN - Marine Spatial Planning System

MFEEE - Mecanismo Financeiro do Espaço Económico Europeu

MFEEE - Mecanismo Financeiro do Espaço Económico Europeu

MFSD - Marine Strategy Framework Directive

MoU - Memorandum of Understanding

MPA - Marine Protected Areas

MSP - Marine Spatial Planning

NGO - Non-governmental organization

NI - Navio de Investigação

NRP - Navio da República Portuguesa

OBS - Ocean-Bottom Seismometers

OECD - Organization for Economic Co-operation and Development

OECD - Organization for Economic Co-operation and Development

PNAB - National Biological Sampling Program

PNAB - National Biological Sampling Program

PO - Program Operator

R&DI - Research, Development and Innovation

ROA - Real Instituto y Observatorio de la Armada

ROV - Remotely Operated Vehicle

RV - Research Vessel

SADCP - Ship-Mounted Acoustic Doppler Current Profilers

SDG - Sustainable Development Goals

SGD - UN Sustainable Development Goals

SIDS - Small Island Developing States

SME - Small and medium-sized enterprises

STI - Science, Technology and Innovation

TA - Technical Assistance Fund

TFEU - Treaty on the Functioning of the European Union

TS - Territorial Sea

UCL - London's Global University

UN - United Nations

UNCLOS - United Nations Convention on the Law of Sea

UNESCO - United Nations Educational Scientific and Cultural Organization

UNG - National Unity of Management

UNG-EEAFM - European Economic Area Financial Mechanism

US - United States

## INTRODUCTION

Over the years, the countries have explored the potential of the sea through fishing, transport, drilling oil, minerals and gas exploration, without any (or with a minimum) concern for the effects of this exploration model or its impacts on future productivity. In the short term, countries with great potential for exploration and diversity may not realize the impact of unbridled maritime exploration. However, small countries and islands that live exclusively from the exploitation of their oceanic potential suffer directly from the impacts caused by unbridled exploration. They fail to boost their economic growth (and consequently fight disease such as hunger, poverty, and unemployment) and are affected by the degradation of marine resources.

The Blue Economy is focused on the sustainable development of the ocean and on reducing the environmental impacts caused by economic development, but the main objective is to boost human well-being and promote social equity. This Blue Economy model seeks to finance coastal states so they can make the most of their ocean resources in a sustainable way, extending the benefits to everyone.

The Blue Economy concept is good and well accepted. The challenge is properly financing the initiative so that it works efficiently. According to the Organization for Economic Co-operation and Development (OECD) “The size of the ocean economy is valued at an estimated 2.5 percent of global gross value added and is growing rapidly. In 2010, prior to the COVID-19 pandemic, the OECD projected that the estimated US\$1.5 trillion in global gross value added to ocean industries – including fishing, shipping, offshore wind, maritime and coastal tourism, and marine biotechnology – would increase to \$3.0 trillion by 2030” (OECD, Ocean Panel, 2019).

As additional to a Blue Economy there is also a parallel initiative headed by the UN: the 2030 Agenda. The 2030 Agenda for Sustainable Development<sup>1</sup> aims to mobilize countries, citizens, and organizations for a more sustainable development of the planet.

Among the 17 goals, there is one exclusive for the development and sustainable use of the ocean, which is the 14<sup>th</sup> SDGs<sup>2</sup>. The goal 14 is related to the conservation and sustainably

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<sup>1</sup> The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.

<sup>2</sup> Sustainable Development Goals

using the oceans, seas and marine resources. Healthy oceans and seas are essential to human existence and life on Earth (UN, 2020). The main SDG goals are many, but we can highlight these ones: “14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution; 14.7 - By 2030, Increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism; 14. A - Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of Developing Countries, in particular Small Island Developing States and Least Developed Countries” (UN Department of Global Communications, August 2023).

The 2030 Agenda, when associated to the “Blue Economy” concept can made countries commit even more to sustainable development of the sea financing initiatives.

## **CHAPTER I – FRAMEWORK**

### **1.1 BLUE ECONOMY**

The Blue Economy is a concept that was born with the aim of encouraging better management of the ocean and all the consumer relations involved. The concept emerged after the “Commonwealth Blue Chart” conference realized in 2020, that highlighted the relationship between the use of the ocean, people's well-being and increasing climate change. According to the conference General Secretary Patricia Scotland: “The Blue Card will help countries develop an integrated approach to building the blue economy that considers the value of often overlooked sectors such as artisanal fisheries, as well as the role of women and youth” (Scotland, Patricia 2020). The “Blue Economy” sees the ocean as a mechanism for economic growth and development but understands that this exploration needs to be done in a sustainable way.

According to the World Bank, the Blue Economy is the “sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem” (World Bank, 2019). European Commission defines it as “All economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors” (European Commission, 2017).

According to the Commonwealth of Nations considers it “an emerging concept which encourages better stewardship of our ocean or blue resources”. Conservation International organization adds that “Blue Economy also includes economic benefits that may not be marketed, such as carbon storage, coastal protection, cultural values and biodiversity”. The Center for the Blue Economy says “it is now a widely used term around the world with three related but distinct meanings: the overall contribution of the oceans to economies, the need to address the environmental and ecological sustainability of the oceans, and the ocean economy as a growth opportunity for both developed and developing countries” (Commonwealth of Nations, 2019).

A United Nations representative recently defined the Blue Economy as an economy that “comprises a range of economic sectors and related policies that together determine whether the use of ocean resources is sustainable. An important challenge of the blue economy is to understand and better manage the many aspects of oceanic sustainability, ranging from

sustainable fisheries to ecosystem health to preventing pollution. Secondly, the blue economy challenges us to realize that the sustainable management of ocean resources will require collaboration across borders and sectors through a variety of partnerships, and on a scale that has not been previously achieved. This is a tall order, particularly for Small Island Developing States (SIDS) and Least Developed Countries (LDCs) who face significant limitations.” The UN<sup>3</sup> notes that the Blue Economy will aid in achieving the UN Sustainable Development Goals, of which one goal, 14, is “Life Below Water” (United Nation, 2012).

## **1.2 HOW TO FUND THE BLUE ECONOMY IN EUROPE (EMFF, EAA GRANTS, PRIVATE FUNDS)**

To improve the Ocean economy development and the Blue Economy there are some funds focused on this type of investment all over the world. Two European investment funds focused on the development of the Blue Economy are the European Maritime and Fisheries Fund “EMFF” and the European Economy Area Financial Mechanisms “EEA Grants”. The “EMFF” is a fund whose main objective is to guide the financing provided by the European Union for fisheries policy, international commitments (such as the 2030 agenda, for example) and maritime policy.

This fund aims to enable sustainable fishing and, consequently, the conservation of the marine environment so that the supply of seafood products is not harmed by excessive consumption. The fund's main priorities are: “Foster sustainable fisheries and the conservation of marine biological resources; Contribute to the Union's food security through competitive and sustainable aquaculture and markets; Enable the growth of a sustainable blue economy and foster the prosperity of coastal communities and Strengthen international ocean governance and ensure safe, clean and sustainably managed oceans and seas” (EEA Grants commission, 2012). The estimated budget for the fund until 2027 is €6,1 billion. The fund management is shared as shown in the chart below:

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<sup>3</sup> United Nation - UN



Figure 1 - Source: <https://webgate.ec.europa.eu/maritimeforum/en/frontpage/568>

The fund regulation is covered by the Regulation (EU) N° 508/2014 of the European Parliament and of the Council of the European Union of 15 May 2014<sup>4</sup> (“Regulation”). According with article 11 and 12 of the Regulation document, the main funding comes from the European Union budget, but an invitation was made to the members states of the European Union to share this budget. In case of sharing this budget, the control of the initiative can change, as said on the article 13 of the Regulation: “It is necessary to distinguish between categories of control and enforcement measures that are co-financed within the framework of shared management, and those co-financed within the framework of direct management. It is crucial to ring-fence the resources to be allocated to control and data collection under shared management whilst allowing flexibility between those two categories of measures” (Regulation EU n° 508/2014).

On the articles 9 to 89, the Regulation talks about the main reasons for the creation of the fund and about the initiatives that must be covered by the fund. On the article 90 the Regulation starts to talk more about the oversight of the fund and the transparency process. In this sense, the article 91 of the Regulation said “Responsibility for monitoring the implementation of an operational program should be shared between the managing authority and the monitoring committee set up for that purpose. According to this, the respective responsibilities of the

<sup>4</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2014.149.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.149.01.0001.01.ENG)

managing authority and the monitoring committee should be specified. The monitoring of an operational program should involve the drawing up of an annual implementation report, which should be sent to the Commission” (Regulation EU n° 508/2014). However, on the fund’s website<sup>5</sup> we cannot understand if this commission (as a compliance team) was created so far. The only commission created by now, as we can understand, is the commission to provide advice, delivery opinions and made the drafts of the implementing acts.

Talking more about the financial characteristics of the fund, the Regulation shows in advance how will be the share of the budget for the years of 2014 to 2020, as following:

*“1. The resources available for commitments from the EMFF for the period from 2014 to 2020 under shared management shall be EUR 5 749 331 600 in current prices in accordance with the annual breakdown set out in Annex II.*

*2. EUR 4 340 800 000 of the budgetary resources referred to in paragraph 1 shall be allocated to the sustainable development of fisheries, aquaculture and fisheries areas, to marketing and processing-related measures and to technical assistance at the initiative of the Member States under Chapters I, II, III, IV and VII of Title V, with the exception of Article 67.*

*3. EUR 580 000 000 of the budgetary resources referred to in paragraph 1 shall be allocated to the control and enforcement measures referred to in Article 76.*

*4. EUR 520 000 000 of the budgetary resources referred to in paragraph 1 shall be allocated to the measures on data collection referred to in Article 77.*

*5. EUR 192 500 000 of the budgetary resources referred to in paragraph 1 shall be allocated to the compensation of outermost regions under Chapter V of Title V. That compensation shall not exceed, per year:*

*(a) EUR 6 450 000 for the Azores and Madeira;*

*(b) EUR 8 700 000 for the Canary Islands;*

*(c) EUR 12 350 000 for the French outermost regions referred to in Article 349 TFEU.*

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<sup>5</sup> [https://ec.europa.eu/oceans-and-fisheries/funding/european-maritime-and-fisheries-fund-emff\\_pt](https://ec.europa.eu/oceans-and-fisheries/funding/european-maritime-and-fisheries-fund-emff_pt)

6. *EUR 44 976 000 of the budgetary resources referred to in paragraph 1 shall be allocated to the storage aid referred to in Article 67.*

7. *EUR 71 055 600 of the budgetary resources referred to in paragraph 1 shall be allocated to measures concerning the IMP referred to in Chapter VIII of Title V.”*

As a public fund, the regulation provides the duties of those who will benefit from the fund's initiatives. The legislation is separated into several themes and each one of them has well-established rules. The most common duty of all of them is that the investment object must remain in the European Union for at least 5 years. If this condition is not maintained, the investment must return to the fund.

In this Regulation, the initiatives don't have a specific duty of being profitable. So, the public funds aren't profitable too. In the analysis it's clear that this is the fund, it has more characteristics of a social program than a financial background. But the question remains regarding the initiatives that are profitable because of the financing of the fund.

To answer this question and make this process clearer, the European Union uses the REGULATION (EU) No 1303/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013<sup>6</sup> (“Regulation 1303”), that is a regulation before of the EFF (European Fisheries Funds) regulation. The Regulation 1303, among other matters, defines how will be sharing the revenue from the initiatives that were helped by a fund financed by the European Union. Remembering that in the EFF case being profitable is not an obligation of the initiative.

The definition of the flat rates is in the Annex V of the Regulation 1303, as follows:

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<sup>6</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1398847168566&uri=CELEX:32013R1303>

**ANNEX V**

**DEFINITION OF FLAT-RATES FOR NET-REVENUE GENERATING PROJECTS**

|   | Sector          | Flat rates |
|---|-----------------|------------|
| 1 | ROAD            | 30 %       |
| 2 | RAIL            | 20 %       |
| 3 | URBAN TRANSPORT | 20 %       |
| 4 | WATER           | 25 %       |
| 5 | SOLID WASTE     | 20 %       |

Figure 2 - Source: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1398847168566&uri=CELEX:32013R1303>

It's difficult to fit in with the initiatives of the EFF fund with this type of division made by the Regulation 1303. And this is not a fault of Regulation 1303, because this legal text was made before the EFF legal creation. So, one more time, it's not easy and clear to know if the return process for those initiatives helped by the EFF fund is profitable.

The European Union has another public fund named by EEA Grants. The EEA Grants is a growth program which is funded by Liechtenstein, Iceland and Norway with the aim of reducing social and economic disparities in Europe.

Among the EEA Grants program's initiatives is "Growth Blue", focused on contributing to the sustainable development of the Portuguese "Blue Economy". The program focuses on the development of new businesses in the area, investigation of themes related to the sea, investments in studies projects and youth entrepreneurship focused on the sustainable development of the sea. Investments so far have been as follows:

| Programmes in Portugal under the EEA Grants 2014-2021                 |           |
|-----------------------------------------------------------------------|-----------|
| Active Citizens Fund                                                  | € 11.00 M |
| Blue Growth, Innovation and SMEs                                      | € 38.00 M |
| Cultural Entrepreneurship, Cultural Heritage and Cultural Cooperation | € 9.00 M  |
| Environment, Climate Change and Low Carbon Economy                    | € 24.00 M |
| Work-life Balance and Gender Equality                                 | € 6.00 M  |
| Bilateral Fund                                                        | € 2.05 M  |

Figure 3 - Source: <https://www.eeaGrants.gov.pt/en/programmes/blue-growth/>

The legal framework of the EEA Grants starts with the EEA Agreement. This was an agreement for creating the European Economic Area (that's why EEA). The agreements intended to bring together the States of Iceland, Lichtenstein and Norway as a single market. It means that in this area the legislation allowed four types of freedom: (i) free movement of goods; (ii) free services; (iii) free movements of persons; and (iv) free movements of capital. Furthermore, the agreement guarantees the cooperation between the States regarding research, education, social policy, tourism, environmental issues and culture<sup>7</sup>.

To comply with the EEA agreement intention the EEA Grants were created. The fund has its own financial regulation made by the Financial Mechanism Committee. The main regulation of this fund is: “(a) Protocol 38c to the EEA Agreement on the EEA Financial Mechanism 2014-2021; (b) the Memorandum of Understanding on the Implementation of the EEA Financial Mechanism 2014-2021 (hereinafter referred to as the MoU), entered into between the Donor States and the Beneficiary State; (c) the program agreements; and (d) any guidelines adopted by the FMC after consultation with the Beneficiary States”<sup>8</sup> (EEA Grants, 2019). So, accordingly with point

<sup>7</sup> <https://www.efta.int/eea/eea-agreement>

<sup>8</sup>

<https://eeaGrants.org/sites/default/files/resources/EEA%2BFM%2BRegulation%2BFinal%2B23%2B09%2B2016%2B.pdf>

“c” above, each program has its own agreement, and this agreement has all the legal guidelines for each project.

In general, the main regulation talks about general provision, strategic approach, information and communication, bilateral relations, management and control systems, programs, selection of projects, eligibility of expenditures, financial management, evaluations, external monitoring and audits, irregularities, suspension of payments, financial corrections, reimbursement and the finals provision. Unfortunately, none of these points of the regulation brings the origin of the total amount of the fund. Also, the regulation doesn't have any instruments of financing return. So, one more time, the fund is legally more like a public donation institution than a fund.

Beyond that, around the world there are other initiatives related to blue funds. Some private blue funds are concentrated in Asia and are usually directed to areas where it is possible to build structures focusing on tourism which can reduce greenhouse gas emissions and pollution of the ocean.

An example is the dual-tranche blue bonds issued by the Asian Development Bank (ADB) focused on projects in Maldives and China (investments around \$151 million). This is an investment for 15 years duration purchased by an insurance company. These bonds are part of the bank plan launched in 2019 to support sustainable investments in the Pacific area and in Asia. The plan of the bank is to provide assistance for investments around \$5 billion by the year 2024.

Other private Blue Bonds initiative and their summary of the terms are:

| Bond                                           | Objective                                                                                                                                                                                                                                                                 | Size and Duration                                                         | Investors                                                                                                           | Key Terms                                                                                                                                                                                                                                           |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seychelles Blue Bond (October 2018)            | Transition support to sustainable fisheries                                                                                                                                                                                                                               | \$15 million; 10 years                                                    | World Bank; Private Placement: Calvert Impact Capital; Nuveen, and Prudential                                       | Loan provided by GEF reduced interest rate for government from 6.5% to 2.8%                                                                                                                                                                         |
| Nordic-Baltic Blue Bond (January 2019)         | Bond issuances focus on investments within water resource management and protection                                                                                                                                                                                       | \$213 million; 5 years                                                    | Capital Market                                                                                                      | 3.75% coupon                                                                                                                                                                                                                                        |
| Morgan Stanley and the World Bank (April 2019) | Sustainable Development Bond to draw attention to the challenge of plastic waste pollution in ocean                                                                                                                                                                       | \$10 million; 3 years                                                     | Capital Market                                                                                                      | Callable step-up fixed rate bond<br>Year 1: 2.35%<br>Year 2: 2.70%<br>Year 3: 3.15%                                                                                                                                                                 |
| Bank of China (September 2020)                 | Finance marine-related green projects across various domestic and overseas markets.                                                                                                                                                                                       | \$ 942.5 million equivalent                                               | Banks and other financial institutions, asset managers, private banks, and insurance companies and other investors. | <b>Tranche 1:</b><br>\$500 million bond priced at 99.694% with a coupon of 0.950% to offer a yield of 1.054% (~ 90 bps above US treasury)<br><br><b>Tranche 2:</b><br>\$442.5 million, priced at par with similar coupon and reoffer yield of 3.15% |
| ADB Blue Bond (September 2021)                 | The proceeds will finance projects that enhance ocean health through ecosystem restoration, natural resources management, sustainable fisheries and aquaculture, reduction of coastal pollution, circular economy, marine renewable energy, and green ports and shipping. | Dual-tranche:<br>a. \$150 million; 15 years<br>b. \$150 million; 10 years | a. The Dai-ichi Life Insurance Company<br>b. Meiji Yasuda Life Insurance Company                                    | a. AUD208 million Coupon: 1.8% Tenor: 15 years<br>b. NZD217 million Coupon: 2.1525% Tenor: 10 years                                                                                                                                                 |

ASEAN = Association of Southeast Asian Nations, GEF = Global Environment Facility, US = United States.

Source: The ASEAN Catalytic Green Finance Facility.

Figure 4 - Summary of the private Blue Bonds

## **CHAPTER II – MANAGEMENT STRATEGIES**

### **2.1. MARINE SPATIAL PLANNING**

As it is more commonly defined, the MSP is a "public process of analyzing and allocating the spatial distribution and timing of human activities in marine areas to achieve ecological, economic, and social goals that are usually specified through a political process" (Ehler & Douvère, 2009). In summary, MSP is a way to organize the use of ocean space and the interactions between human uses and between uses and the marine environment.

As a continuous and interactive process MSP must be regularly funded and adapted, planning cycle after planning cycle, and which requires the involvement of 'multiple stakeholders and stakeholders at various levels of government and society' (Olsen et al., 2014) due to its 'public' nature. MSP concept emerged almost 40 years ago in the context of marine conservation planning, dating back to the 1980s (Day, 2002). Some suggest that the MSP has its roots in marine conservation and the original Great Barrier Reef zoning plan.

The Reef Marine Park (GBRMP) in Australia is a "pioneering example of MSP" (Jay et al., 2013). But, as MSP has spread around the world, it appears that its conservation base has diluted, in some cases, (Merrie & Olsson, 2014). There has been a noticeable shift towards a growing need to manage conflicting maritime uses, both existing and future, especially in crowded ocean spaces and highly industrial maritime areas (Young et al., 2007).

With the number of countries with MSP initiatives has increased around the world and MSP processes have begun to be implemented, monitored and reviewed, so has the amount of MSP-related information and expertise. The scientific literature on MSP began in the 1960s-1970s, and since 2006 there has been a significant expansion in the number of scientific articles, books, book chapters, reports, and academic theses on the subject. Much of this increased academic interest in MSP seems to have stemmed from the first international workshop on MSP that was organized by UNESCO's Intergovernmental Oceanographic Commission (IOC) in 2006. Currently, there are more than 900 scientific articles published in international peer-reviewed journals on MSP and almost 10,000 articles on Google Scholar when searching only for "marine spatial planning" (Merrie and Olsson, 2014).

One of the most well-known and applied documents on MSP is the IOC-UNESCO guide entitled *Marine spatial planning: a step-by-step approach towards ecosystem-based management* (Ehler & Douvère, 2009). MSP is a complex process, full of complexities, the COI-UNESCO guide explains it in a very thorough, clear and objective way (Frazão Santos, Economic Models I, 2019).

## **2.2. MARINE SPATIAL PLANNING GLOBALLY**

Due to its potential and relevance for the implementation of operational ocean management and governance, MSP has gained considerable importance in the last decade, and many nations around the world have begun to develop their own spatial planning processes. As stated, the MSP "is an idea whose time has come" and therefore an idea that ultimately should not be resisted (e.g., Ehler, 2012; Ehler & Douvère, 2009). Indeed, it has been argued that the global dimension of MSP "reflects the international scientific and political discourse that calls for the adoption of MSP in the interest of environmental integrity and the sustainable use of the world's seas and oceans" (Jay et al., 2013).

MSP is currently under development in more than 66 countries worldwide (IOC-UNESCO, 2017a), spanning six continents (Europe, Africa, Asia, Australia (Oceania), North America and South America) and four ocean basins (Atlantic, Pacific, Indian Ocean and Arctic) (Frazão Santos, Economic Models I, 2019).

While most countries (around 70%) are still in the early stages of their MSP initiatives, others have already approved, implemented or even revised marine spatial plans. Indeed, MSP is already in place (i.e. approved by the government) in 22 countries (Table 30.1) which together account for almost 27% of the world's exclusive economic zones (EEZs) (the percentages of EEZs are calculated on the basis of information from Claus et al (2017), excluding overseas territories, except where they are expressly mentioned in the Table 30.1). These include Belgium, Germany, the Netherlands, Norway, China and Belize, where the MSP covers most of the maritime space, focusing on its EEZ and/or territorial sea, but also countries where the MSP is in place only for a certain area under national jurisdiction, such as a province, a municipality or a state, for example, the United States, Canada and Croatia (see Table 30.1). It is expected that the other 44 countries in which the MSP is currently being developed (and representing an additional 26% of the world's EEZs) will have their MSP processes approved in the coming years. Countries with marine spatial

plans already completed and pending approval are likely to have MSPs in place in the near future, including European Union (EU) Member States that must have marine spatial plans approved by 2021 to comply with the European MSP Directive (European Commission, 2014). This means that by 2030, a key date for the conservation and sustainable use of the oceans (see United Nations Sustainable Development Goal 14), MSP will be in place in more than half of the world's EEZs, i.e., in the ocean space under national sovereignty (Frazão Santos, Economic Models I, 2019).

In regional perspective, Europe and the Americas are the regions with the largest number of countries and territories working in MSP—that is, 37% and 28% of all countries and territories, respectively (Frazão Santos, Economic Models I, 2019). This prevalence of Europe and the Americas is also valid for all phases of MSP development, as these two regions cover approximately three-quarters of the countries/territories in each phase. By contrast, in the Middle East, only two countries (3%) are currently developing MSP, both at an intermediate stage in the process. In Africa, MSP initiatives, particularly in Angola, Namibia and South Africa, essentially covering the large marine ecosystem of the Benguela Current, are recent and in their early stages (11% of countries), while in Oceania and Asia (10% and 11%, respectively) MSP is found from the pre-planning stage to the review phase (Frazão Santos, Economic Models I, 2019).

The national level, prominent maritime nations such as Norway and China are leading the development of MSP (Ehler, 2013). The following sections provide an overview of national initiatives by geographical region. For detailed information on individual national MSP processes, visit the IOC-UNESCO website on MSP worldwide (IOC-UNESCO, 2017b), the European MSP platform (European Commission, 2017), the analyses of Jay et al. (2013), Collie et al. (2013), Agardy et al (2012) and Douvere and Ehler (2009a, 2009b).

### **2.3. INTEGRATED COASTAL ZONE MANAGEMENT (ICZM):**

Integrated Coastal Zone Management (ICZM) is an ecosystem-based management approach that aims to address the complex and interconnected challenges facing coastal areas. It emphasizes sustainable development, environmental protection, and the preservation of coastal ecosystems (Aurora P. Alabastro and Ma. Mercedita V. Tumacder (2007).

#### **Key Principles and Components:**

1. Holistic Approach: ICZM considers the entire coastal area as a single, interconnected

system, recognizing the interactions between land, sea, and human activities.

2. Sustainability: It seeks to balance economic, social, and environmental interests to ensure the long-term health and resilience of coastal ecosystems.

3. Stakeholder Engagement: ICZM involves active participation and collaboration among government agencies, local communities, businesses, and NGOs to make decisions and implement plans.

4. Ecosystem-Based Management: It focuses on preserving and restoring natural habitats, biodiversity, and ecosystem services.

5. Adaptive Management: ICZM is flexible and adaptive, allowing for adjustments as new information becomes available or as conditions change.

6. Multi-disciplinary Approach: It draws on various disciplines, including ecology, economics, urban planning, and social sciences, to address complex coastal issues.

## **2.4. BENEFITS OF ICZM:**

- Environmental Protection: ICZM helps protect coastal ecosystems, such as wetlands, mangroves, and coral reefs, which are critical for biodiversity and storm protection.

- Sustainable Development: It supports economic activities like tourism, fisheries, and shipping while ensuring they do not harm the environment.

- Resilience: ICZM enhances the resilience of coastal communities to climate change impacts, including sea-level rise and extreme weather events.

- Conflict Resolution: By involving stakeholders, ICZM helps resolve conflicts over resource use and development.

ICZM is typically implemented through a combination of policies, regulations, spatial planning, and community engagement. It may involve the development of coastal management plans, zoning regulations, and the establishment of protected areas. Governments often play a central role in coordinating and facilitating ICZM efforts.

In summary, Integrated Coastal Zone Management (ICZM) is an inclusive and sustainable approach to managing coastal areas, striving to balance the needs of people and nature while preserving the ecological integrity of these vital regions.

## **2.5. MARINE PROTECTED AREAS:**

Marine Protected Areas (MPAs) are a critical tool in the conservation and sustainable management of marine ecosystems. These areas, which can encompass a variety of marine environments such as coral reefs, seagrass beds, and open ocean waters, are established to protect and preserve the biodiversity and ecological health of the world's oceans.

In her book "Marine Protected Areas: Tools for Sustaining Ocean Ecosystems," Sue Wells delves into the concepts, principles, and importance of MPAs in the context of ocean conservation. The book emphasizes that MPAs serve as sanctuaries for marine life, allowing for the recovery of overexploited species and the protection of fragile habitats.

MPAs are not only ecologically significant but also play a crucial role in supporting sustainable fisheries. By designating specific areas where fishing activities are regulated or prohibited, MPAs contribute to the replenishment of fish populations, enhancing the resilience of marine ecosystems, and benefiting coastal communities dependent on fisheries.

Wells discusses the multidisciplinary nature of MPAs, highlighting their ecological, social, and economic dimensions. Effective MPA management involves collaboration among scientists, policymakers, stakeholders, and local communities. Furthermore, the book underscores the need for adaptive management approaches that can respond to changing environmental conditions and human pressures.

As the global community faces increasing challenges such as overfishing, habitat degradation, and climate change, the establishment and proper management of MPAs have become essential tools in mitigating these threats. Sue Wells' book provides valuable insights into the principles, techniques, and real-world examples of MPAs, emphasizing their crucial role in sustaining the health and biodiversity of our oceans.

## CHAPTER III – EEA GRANTS

### 3.1. EEA GRANTS

The European Economic Area (EEA) is made up of the Member States of the European Union and the countries of the European Free Trade Association (EFTA), namely Iceland, Liechtenstein and Norway, which share the same Internal Market.

Through the Financial Mechanism of the European Economic Area (EEMF) 2014-2021, Iceland, Liechtenstein and Norway, as Donor States, finance, in 15 Member States of the European Union, initiatives and projects in several areas' programs, with a view to:

- Reduce economic and social disparities.
- Strengthen bilateral relations between Donor States and States Beneficiaries.

The Regulation for the implementation of the 2014-2021 MFEEE<sup>9</sup>, hereinafter referred to as Regulation, provides in Article 5.1 that the Beneficiary State is responsible for the program management and control. The management and control systems established by the Beneficiary State for the 2014-2021 MFEEE must ensure respect for the principles of accountability, economy, efficiency and effectiveness.

The management and control systems must provide for:

- a) Definition of the functions of the entities involved in the management and control and the distribution of roles within each entity;
- b) Compliance with the principle of separation of functions between these entities and within them;
- c) Procedures to guarantee the correctness and regularity of expenses;
- d) Reliable accounting, monitoring and financial reporting systems in computerized form;

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<sup>9</sup> Mecanismo Financeiro do Espaço Económico Europeu

- e) Reporting and monitoring system when the responsible entity delegates the performing tasks for another entity;
- f) Provisions for auditing the functioning of the systems;
- g) Systems and procedures to ensure an adequate audit trail;
- h) Procedures for reporting and monitoring irregularities and recovery of unduly paid amounts.

### 3.2. FUND MANAGEMENT

Pursuant to Article 5.2 of the Regulations, it was defined in the Memorandum of Understanding (MoU), signed on 22 May 2017 between donor states (Iceland, Liechtenstein and Norway) and the Portuguese State, the entities responsible for implementation of the MFEEE2014-2021, as reproduce below:

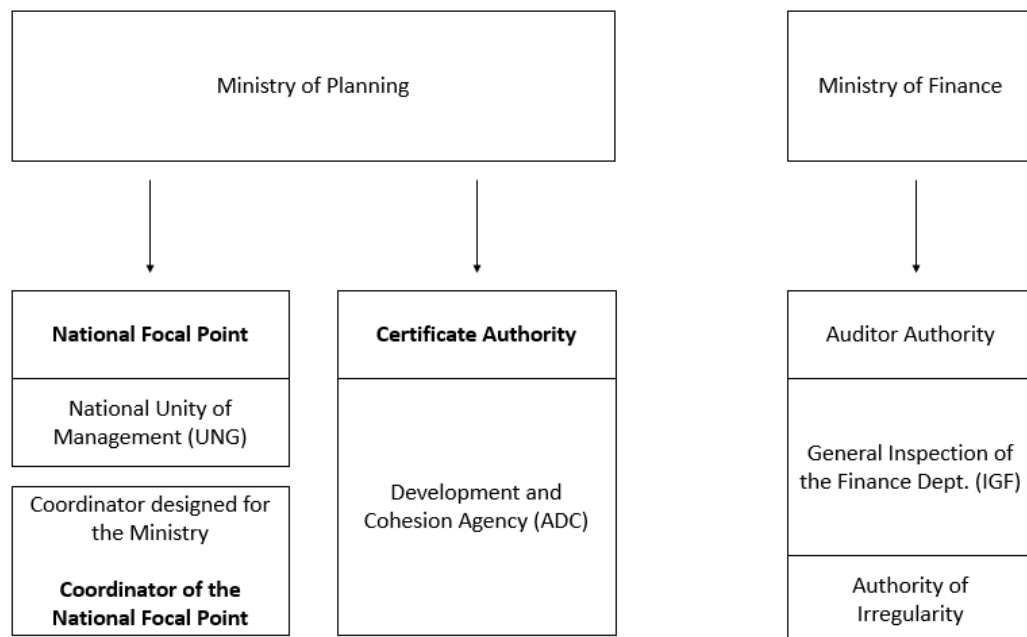


Figure 5 - Map with the entities responsible for the MFEE implementation

According to the EEA Grants, the fact that the National Focal Point and the Certification Authority act within the scope of the same Ministry does not affect the independence of its performance, as described in the present document.

The main functions of the UNG<sup>10</sup>, in accordance with the provisions of the Regulations are:

“a) Represent Portugal in its relations with the Financial Mechanism Committee (FMC) and with the Financial Mechanism Office (FMO);

b) Ensure the dissemination to the public of information about the existence of the MFEEE 2014-2021 in Portugal and ensure that Program Operators (PO) fulfill their information and publicity obligations in accordance with the requirements of Article 3.2 of the Regulations;

c) Ensure that the Programs are implemented in accordance with the legal framework of the 2014-2021 MFEEE referred to in Article 1.5 of the Regulation;

d) Regularly monitor the progress and quality of the implementation of the Programs relative to the progress of the indicators established for the contracted objectives and results and in accordance with the conditions their financial statements for reporting in the Annual Strategic Report;

e) Carry out regular risk monitoring of the Programs in relation to their progress, results and objectives defined for reporting in the Yearly Strategic Report;

f) Organize the Annual Meeting with the FMC/FMO;

g) Coordinate and manage the Technical Assistance Fund (TA) provided for in Article 1.10 of the Regulation and the Fund for Bilateral Relations (FBR) provided for in Article 4.6 of the Regulation;

h) Establish and chair the Joint Bilateral Funds Committee (JCBF) in the terms of Article 4.2 of the Rules;

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<sup>10</sup> National Unity of Management

i) Approve the Descriptions of the Management and Control Systems of the Operators of Programs (OP), pursuant to Article 5.7 of the Regulation;

j) Follow up on audits conducted by the EFTA Board of Auditors and the on-site audits and verifications conducted by the FMC.” (National Unity of Management, 2017)

In Portugal, the National Management Unit of the European Economic Area Financial Mechanism (UNG-EEAFM) was created by the Council of Ministers Resolution No. 39/2017 of March 10th, rectified by the Rectification Declaration No. 14/2017 of April 24<sup>th</sup>.

The UNG-EEAFM is under the supervision of the Minister of Planning, as established in paragraph No. 2 of article 22 of Decree-Law No.169-B/2019, Decembre 3<sup>rd</sup>, which approved the organization and functioning regime of the XXII Constitutional Government (National Unity of Management, 2017).

In accordance with the provisions of the EEAFM Regulation 2014-2021 and the Memorandum of Understanding (MoU) signed between Portugal and the Donor Countries (Norway, Liechtenstein and Iceland) on May 22nd 2017, the UNG-EEAFM, as the National Focal Point, has the overall responsibility to ensure that the Programmes contribute to the achievement of the objectives of the EEAFM 2014-2021 in Portugal and to ensure its implementation in accordance with the established implementation principles (EEAFM Regulation 2014-2021).

The administrative and logistical support necessary for the operation of the National Focal Point is ensured by the General Secretariat of the Presidency of the Council of Ministers.

In Portugal, the UNG MFEEE receive the support of:

- General Secretariat of the Presidency of the Council of Ministers
- Agency for Development and Cohesion
- General Inspection of Finance

- FMO.<sup>11</sup>
- Embassy of Norway in Lisbon
- Embassy of Portugal in Oslo
- Program Operators:
  - ✓ Blue Growth Program: General Directorate of Sea Policy (DGPM)
  - ✓ IGC.<sup>12</sup>
  - ✓ DGPC.<sup>13</sup>
  - ✓ Active Citizens Program

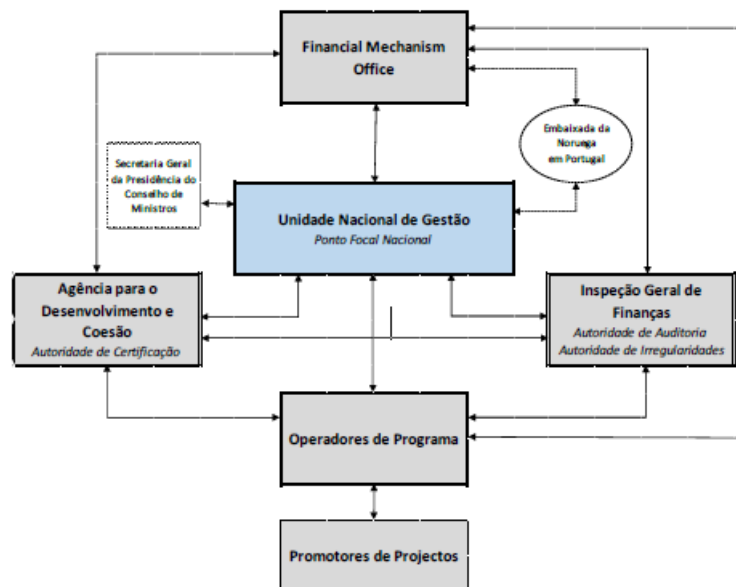


Figure 6- EEA Grants plan of activities in 2019

<sup>11</sup> Financial Mechanism Office

<sup>12</sup> Instituto Gulbenkian de Ciência

<sup>13</sup> Direção-Geral do Património Cultural

### 3.3. INVESTMENT IN PORTUGAL

The main areas of support will be:

- “Increasing value creation in the blue economy in collaboration with enterprises and researchers in Iceland, Liechtenstein and Norway.
- Fighting climate change and improving environmental management capacity.
- Improving work-life balance and gender equality.
- Strengthening cultural heritage management systems.
- Contributing the strong support to civil society” (EEA GRANTS, 2019).<sup>14</sup>

The resources allocation is:



Figure 7 - source: <https://eeaGrants.org/countries/portugal>

<sup>14</sup> EEA Grants Area of Support – accessed on: <https://eeaGrants.org/countries/portugal>

The allocation by sector of the civil society is:

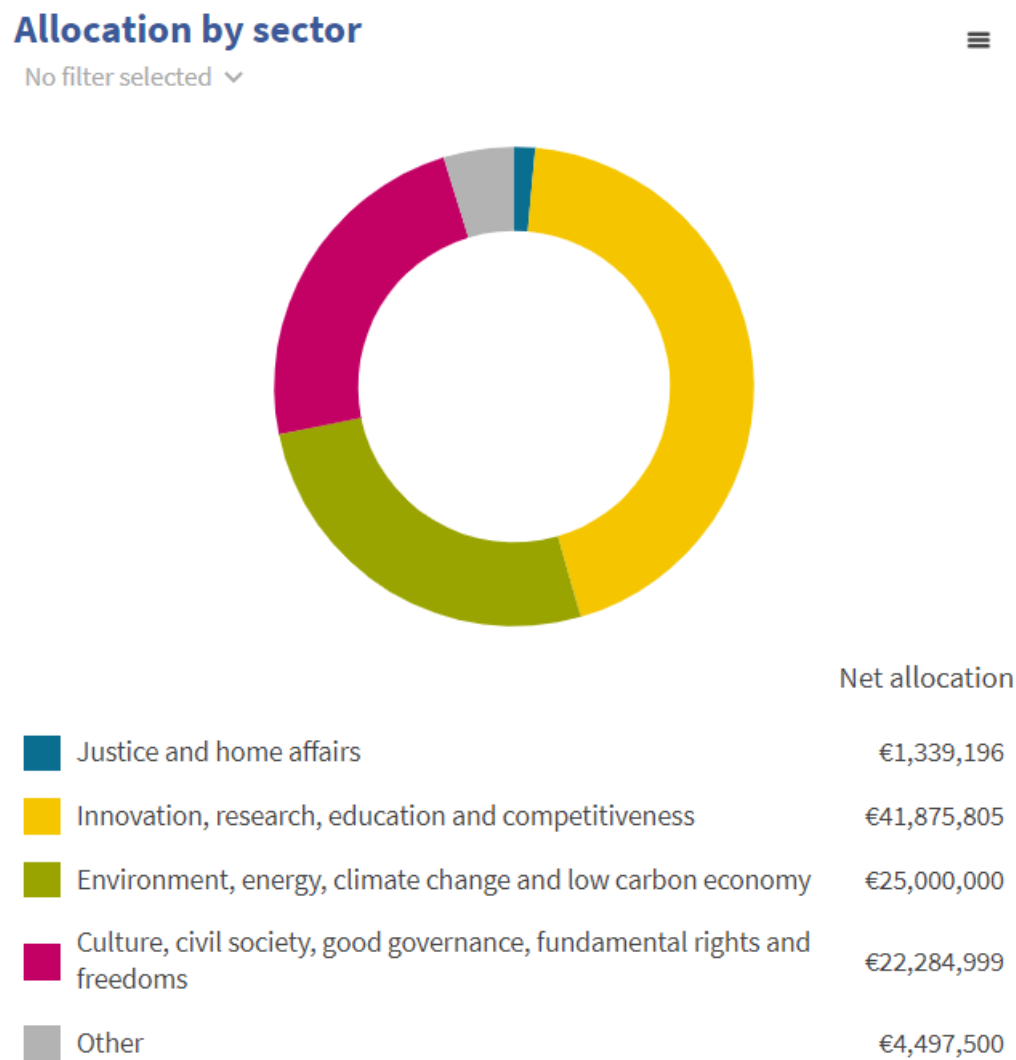


Figure 8 - Source <https://eeaGrants.org/countries/portugal>

In Portugal, the program related to the ocean it's possible to see four main initiatives related to Increased competitiveness for blue enterprises, resource efficiency in the marine sector, research and education in marine and maritime issues. It aims to increase value creation and sustainable growth, including long-term marine and maritime economic growth, social cohesion (in terms of local communities and maritime activities), and marine environmental protection. It will support sustainable growth, new jobs and private enterprises to develop,

commercialize and apply blue products and technologies. Four enterprises in the marine sector will be supported to apply innovative products and technologies that use marine litter as secondary raw material (EEA GRANTS, 2019).<sup>15</sup>

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<sup>15</sup> EEA Grants Portugal – accessed on: <https://eeaGrants.org/news/programme-agreement-signed-for-the-innovation-programme-in-portugal>

## **CHAPTER IV – PRINCIPLES FOR HIGH SEAS GOVERNANCE – IMPORTANCE OF THE PUBLIC POLICIES EVALUATION**

### **4.1. PRINCIPLES FOR HIGH SEAS GOVERNANCE**

National jurisdiction over resources has recently been extended to 200 nautical miles in the sea, leaving about 60 per cent of the ocean as “high seas” and deep seabed beyond national jurisdiction. Long treated as though empty of life other than some fishes, we are now discovering that these areas of the oceans contain some of the richest biodiversity on the planet.

These High seas biodiversity is under increasing threat from many sources, including irresponsible fishing and shipping activities, pollution and climate change. Yet, there is no comprehensive policy or management framework to govern the high seas, and the patchy laws that exist are largely based on 17th century principles of open access, ignoring many of the environmental principles that have been long applied for land and atmosphere and even for outer space. Beyond national jurisdiction, many human activities remain unregulated, ecosystem considerations are seldom taken into account and scientific information is often ignored. Experience in managing ocean resources has provided many lessons that need to be put into practice.

Critical policy issues to improve high seas governance are ready to be addressed and practical steps can be taken to improve biodiversity conservation. Past limitations in monitoring and enforcement of ocean governance regimes have been overcome by technological advances, but the political will to commit resources to this task is still lacking. A good start has been made, but more needs to be done. We stand at a critical time – the ocean governance system must evolve, and the following modern principles applied to improve high seas management and ensure sustainable development of the world’s oceans.

Below are the explanations for each principle and what is the importance for the principle to the best governance of the sea:

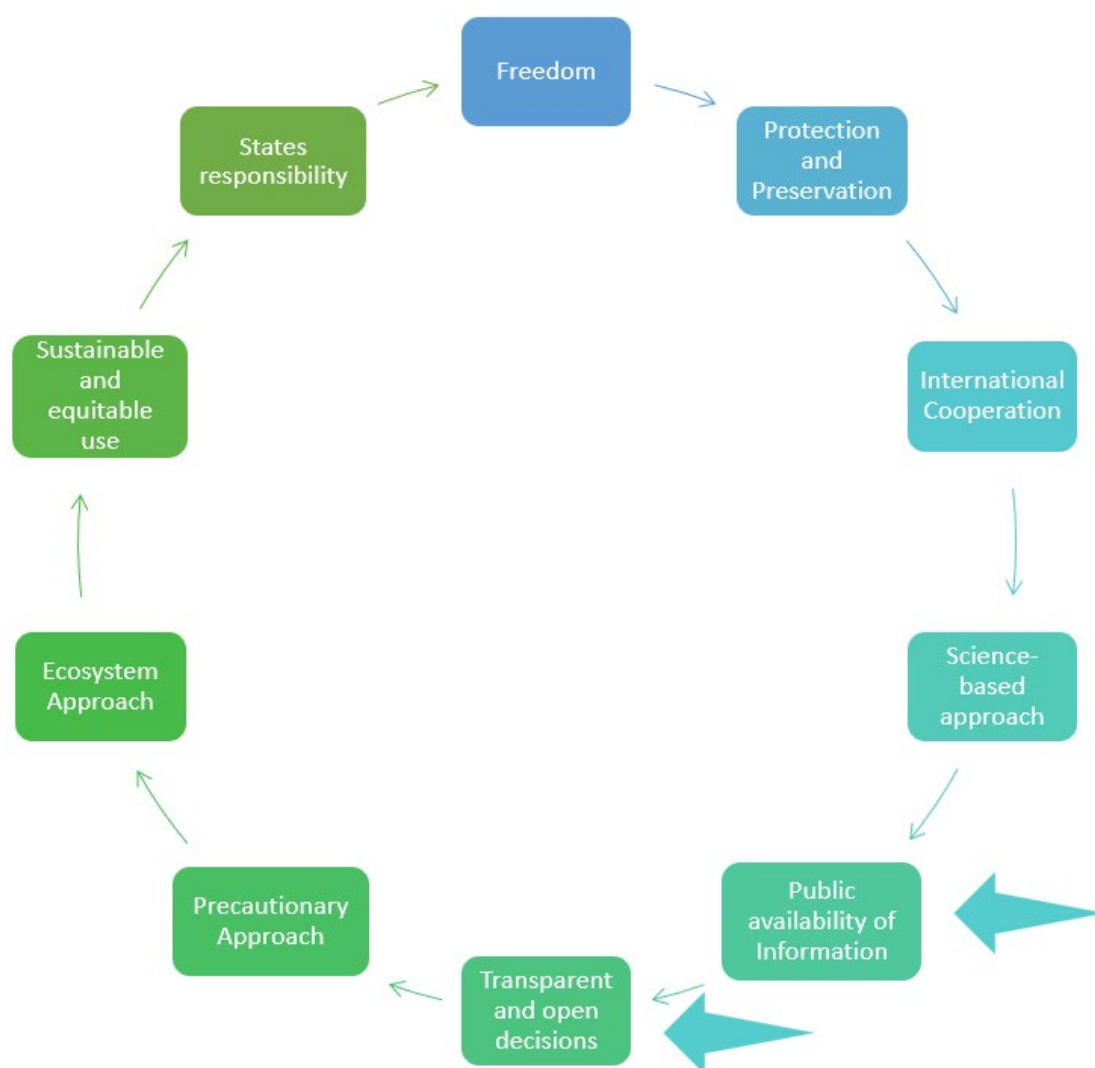


Figure 10 - Precautionary principle ecosystem – image made by Bruna Barreto for this dissertation.

## **CHAPTER V – STUDYING CASE INSIDE OF THE EEA GRANTS THE MÁRIO RUIVO RESEARCH VESSEL**

### **5.1 INTRODUCTION – THE CASE**

In the scope of the implementation of “PDP1 - Acquisition and Fitting of a Dynamic Positioning (DP) Vessel Equipped with Marine Surveying Equipment”, under the program European Economic Area Financial Mechanism, EEA Grants 2009-2014 (Portugal), IPMA acquired a new ship, an ocean-going research vessel (RV). The vessel undertook significant transformations that allowed the fulfilment of predefined project objectives and became a new platform to conduct research on the Atlantic Ocean to the service of the national and international S&T community, contributing to increase scientific knowledge, leading to more informed policies and improving the management of the maritime space and its resources.

The new vessel (currently under the name Mário Ruivo Research Vessel) design enables the use of the Portuguese 6000m depth Remotely Operated Vehicle (ROV) named Luso, including high precision operations both near-shore and in open ocean conditions, dry and wet laboratories and new facilities for several disciplines and namely deep-sea geological research units and fishing research operations.

Despite the improvement, Mário Ruivo Research Vessel would benefit greatly with tools in what concerns habitat mapping, acoustic oceanographic monitoring and research, or interaction with seafloor and water column observatories. These tools would improve the robustness of studies related to the application of the Marine Strategy Framework Directive, demersal studies using bottom trawls or more sophisticated fishery acoustics.

To optimize the acquisition of oceanographic data during ship operations, it's needed to install a set of hull-mounted sensors that will provide new capacities for the research vessel:

- Hull mounted Acoustic Doppler Current Profiler (ADCP) for continuous oceanographic measurements,
- Swath bathymetry system for detailed seafloor mapping,



## 5.2 CASE DEVELOPMENT

The ship was built in 1986 as a support ship for the British fleet, Mário Ruivo Research Vessel was named Salmaid. It was later acquired by Hays Ships company and renamed Kommandor Calum. In 2013 underwent a profound modification with the addition of a new bow and a new floor on the superstructure and it was converted into a research vessel dedicated to technical-scientific surveys.

At Hays the vessel Kommandor Calum, operated a fleet of ships for scientific research, survey, and patrol working for large a range of clients.

In 2015 the vessel was acquired by the Portuguese Government for the Portuguese Institute of the Sea and the Atmosphere (Instituto Português do Mar e da Atmosfera, IPMA) and was designated firstly research vessel “Mar Portugal” and after research vessel “Mário Ruivo Research Vessel”, in honor of the famous scientist the important Portuguese biologist and oceanographer. IPMA organization was a result of the merger of two state laboratories, the Institute of Fisheries and Sea Research and the Institute of Meteorology. The ship was on the dock in Lisbon where the British flag was changed to the Portuguese flag and the hull was painted with the new name.

It was initially a submarine defense and rescue vessel, later it was converted into a research vessel and technical-scientific surveys in deep waters. It had already undergone a major transformation in 2013 to improve accommodation and surveying capacity, and is now prepared to carry out marine geotechnics, oceanography, geophysical surveys and the operation of underwater robots (ROV), says a statement from the Ministry of Agriculture and the Sea. At the time, Portugal only had one ROV — the Luso, purchased in 2008 for a total of three million euros — which dived to great depths (up to 6000 meters).

Since the conversion, Kommandor Calum has been working on a global scale: in 2014 sailed in the Russian Arctic, North Sea, Atlantic and Mediterranean. The next step was the opening of international tenders by the government, both for the transformation of the vessel, which now is ready for fisheries research, and for the purchase of scientific equipment.

The ship came to replace the Portuguese scientific research vessel *Noruega*, which had

not always been operational and required major repairs. Serving the country for more than 35 years, the 47.5-metre-long old ship was home to 12 scientists and technicians. It was used in biology studies, resource assessment, experimental fisheries and oceanographic research. But the work to widen the Portuguese continental shelf had to be done by other ships with other capabilities, namely the Navy oceanographic ships, NRP<sup>16</sup> *Almirante Gago Coutinho* (where the ROV *Luso* operated) and NRP *D. Carlos I*.

The *Noruega* had already been part of a Norwegian EEA Grants aid program to Portugal, hence its name. When the purchase of the new ship was announced in 2011, there was talk that *Noruega* would be scrapped.

### 5.3 PROJECT MAIN OBJECTIVE

Accordingly, with IPMA's internally report, the main objective of the project was to upgrade the Mário Ruivo Research Vessel as a fully-fledged multidisciplinary scientific platform equipped with modern hull mounted survey equipment for seabed mapping, environmental, ecology and fisheries research to support marine knowledge and insure sustainability of Blue Growth economic activities. The program PDP3 "Research Vessel Mar Portugal: Hull Mounted Scientific Equipment" aims at installing a set of Hull Mounted Equipment (HME) on the ship. This upgrade will foster its capacity as a modern ocean sensing platform (Nieuwejaar et al., 2019), aiming at improving fishery research, seabed mapping and marine geosciences, for the assessment of living and non-living resources and bioprospection.

The idea of new equipment was foster national and international initiatives (Atlantic Observatory, EMSO-PT<sup>17</sup>, OCEANTECH, Eurofleets, EURO-ARGO) as well as international cooperation (EU, EFTA and CPLP), where Portugal is committed to increase the observation of the Atlantic and the maintenance of long-term oceanographic data series. The project comprises mostly investment on HME such as:

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<sup>16</sup> NRP means Navio da República Portuguesa, or Portuguese Republic Ship.

<sup>17</sup> The European Multidisciplinary Seafloor and water column Observatory (EMSO - <http://emso.eu/>) is a consortium of partners sharing in a common strategic framework scientific facility. Formally it is a European Research Infrastructure Consortium (ERIC), legal framework created for pan-European large-scale research infrastructures. This consortium gathers 8 countries (France, Greece, Ireland, Italy, Portugal, Romania, UK and Spain) and constitutes one of the underwater parts of COPERNICUS.

**1) “Scientific split beam echo sounders (4 to 6 channels) to increase the quality of fisheries acoustic monitoring and stock assessment.**

Acoustic surveys are developed in Portugal since the late 1970s and were introduced for fish detection and abundance estimation by a cooperative project involving Norway and France (see Massé et al., 2018 and references therein). Cooperation between Norway, Portugal and Spain led also to the first internship calibration between RV “Fridtjof Nansen”, RV “*Noruega*”, and RV “*Cornide de Saavedra*” in 1982 (idem). Acoustic surveys are made on a regularly basis. Yearly, two acoustic surveys take place in Portugal, one in the spring for sardine and anchovy biomass assessment and another in the fall dedicated to the assessment of recruitment.

**2) Oceanic range multibeam for seabed and habitat mapping to retrieve baseline data for economic uses and activities at sea.**

Multibeam technology was developed for geosciences studies because it can give a high-resolution imagery of the seafloor morphology and, with the use of the backscatter, characterize the sediment type or seabed hardness. Nevertheless, high quality morphological and textural information is also relevant for the study of distribution of plants and animals on the continental shelf and, finally, to assess habitats distribution and reduce the need for direct sampling. Indirectly they are also important for fishery research and the sustainable harvesting of marine living resources. Systematic habitat mapping using a combination of acoustic techniques was developed for example by MAREANO (Marine areal database for Norwegian waters) project, a landmark in seabed research (Bjarnadóttir et al., 2018). A coastal multibeam system is already operated by IPMA on board of a 17.7m vessel (RV *Diplodus*) but the availability of a medium depth system on-board RV *Mar Portugal* can be considered a priority, being complementary to existing deep-sea systems available at the Portuguese Navy.

**3) ADCP to measure water current velocities and suspended materials over a depth range to support ocean frontal mapping and fisheries research.**

Ship-mounted acoustic doppler current profilers (SADCP) have been used for more than 35 years and have been available on most research ships for much of that time. They are easy to operate on a routine basis, permitting nearly continuous monitoring of upper ocean current structure beneath each ship (Firing and Hummon, 2010). SADCP measures the velocity of the

upper-ocean currents below the ship. When used in conjunction with the ship's heading and navigation data, absolute currents in the upper ocean can be determined. This is very important for oceanography studies but also for understanding the interactions between biology and ocean processes. For example, Sánchez et al. (2008) used data from ADCPs mounted on board research vessels (e.g., RV Poseidon and RV D. Carlos I) to characterize upwelling filaments off Cape St. Vincent. Plankton derived with currents and information about the ocean circulation is fundamental for understanding its dynamics. Moreover, ADCP could be used to estimate zooplankton biomass and ecology (Heywood, 1996), and to study the dynamics of deep-scattering layers in the ocean which are of much importance for ocean trophic ecology (Hazen and Johnston, 2010).

#### **4) Parametric sub-bottom profiler for subsurface studies and supporting I&T infrastructure.**

Sub-bottom profilers can assess, in a quantitative way, the acoustic properties of the seafloor, namely the acoustic impedance and the roughness. These parameters can be used to characterize substrate type, if coupled with multibeam devices and/or video cameras and give relevant information for the study of benthic communities. In the case of (very limited) bottom trawling needed for the surveying of ground fish, crustaceans or even marine litter, the use of a sub-bottom profiler can reduce the environmental footprint, increase the safety of the operations and optimize the sampling design. This equipment has never been equipped with the old ship Noruega Research Vessel.

It's possible to summarize the applications of the different instruments as follows:

| <b>Equipment</b>                                      | <b>Scientific Applications</b>                                                                   |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Scientific split beam echo sounders (4 to 6 channels) | To increase the quality of fisheries monitoring and assessment                                   |
| Full oceanic range multibeam                          | For seabed and habitat mapping to retrieve baseline data for economic uses and activities at sea |

|                                |                                                                                                                                        |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| ADCP                           | To measure water current velocities and suspended materials over a depth range to support ocean frontal mapping and fisheries research |
| Parametric sub-bottom profiler | For subsurface studies and supporting deep trawling and I&T infrastructure                                                             |

*Table 1: Summary of the scientific applications of the equipment*

## 5.4 INVESTMENT

The total investment of the EEA Grants in the first phase of the Ship project was €11,000,000, and with some national Portuguese investments. The national investment was €1,941,176. Of these €12,941,176 of payments in the first step, €8,000,000 were spent just on the purchase of the ship's case infrastructure, which generated a great deal of discussion, as in addition to being more expensive than expected, it was an old ship, with old technology considered "outdated", and a very old construction date in 1986. However, the purchase of the ship and its respective maintenance and adaptation took place.

In a second phase, the EEA Grants invested more €2,000,000 and Portugal another €500,000 to adapt the vessel in order to receive the ROVs. This technology allowed the use of technology to do marine geotechnics, oceanography, geophysical surveys and operation of underwater robots.

## Funding



| Phase 1               |                    | Phase 2               |                   |
|-----------------------|--------------------|-----------------------|-------------------|
| Total budget          | <b>12.941.176€</b> | Total budget          | <b>2.500.000€</b> |
| EEA Grant             | <b>11.000.000€</b> | EEA Grant             | <b>2.000.000€</b> |
| National contribution | <b>1.941.176€</b>  | National contribution | <b>500.000€</b>   |

*Table 2 - EEA Grants division fund for Mário Ruivo Research Vessel*

## 5.5 IMPACT

Since 2021 the vessel has accomplished some projects in order to impact the marine environment and returns the investment made by the government. These projects are the source of income of the vessel and consequently are part of the positive impact of the vessel on the society. The investment made by the EEA Grants was not only related to the purchase of the vessel and equipment, but also for the oceanographic campaign itself. According to the IPMA and DGPM these are all the project developed on the vessel since the beginning of the operation in Portugal:

- **EMSO-PT | Leg 1:**

The oceanographic campaign EMSO-PT | Leg 1 had as main objective the installation of an oceanographic station at 200 m depth that will allow high-resolution observation of the first 150 m of the water column in continuous, with about a hundred daily vertical profiles of temperature, salinity, depth, chlorophyll, turbidity, and dissolved oxygen, in order to deeply understand the ecosystem, from the local scale to the climate variability scale. The long-term in real time observation of marine environmental processes, including interactions between the geosphere, biosphere and hydrosphere, is a pioneer study in Portugal. This observation station is part of the EMSO-PT project, integrated in the EMSO – European Multidisciplinary Seafloor and Water-Column Observatory consortium, designed as a distributed set of observation resources located in key places for the study of marine processes, in the Arctic, Atlantic, Mediterranean and Black Sea.

- **Crustáceos 2021:**

The oceanographic campaign Crustaceans 2021 was held on the Mário Ruivo Research Vessel, with the main objective to monitor the abundance indices and collect biological information of Norway lobster, rose shrimp and other deep-sea crustaceans in the continental slope area off Alentejo and Algarve. This campaign is part of the National Biological Sampling Program (PNAB) and focus on the abundance estimation, spatial distribution and length structure of the main species in the south-western and southern waters of Portugal, namely Norway lobster and rose shrimp populations, as well as other crustacean species such as the red shrimp and accompanying species such as blue whiting, anglerfish, megrims and watch fish.

International students from the “EurofleetsPlus Floating University” participated in the survey Crustaceans 2021, with the course’s main goal to provide theoretical knowledge and practical experience in the scientific knowledge of conservation, management and sustainability of marine resources ecosystems, using *Nephrops norvegicus* (Norway lobster) as a case study.

- **UPFLOW**

The oceanographic campaign UPFLOW had as its main objective the installation of several ocean-bottom seismometers (OBS) through the research on Mário Ruivo Research Vessel. These high-precision instruments will allow the collection of seismic images of the interior of the earth’s mantle in the geographical area of the Canary Islands and the volcanic islands of Azores and Madeira. This unprecedented experiment will allow a resolution of the order of 100-200 km, to a depth of about ~1,000-1,500 km in a wide area of the Atlantic Ocean floor by the recording of movements inside the Earth’s mantle at the bottom of the ocean (natural seismicity), and thus reconstruct the upward geological flow, which originates the volcanic eruptions and, respective, earthquakes. The UPFLOW project has received funding from the European Research Council (ERC), and is a cooperation between London’s Global University (UCL), Alfred Wegener Institute, University of Potsdam, Helmholtz Centre Potsdam (GFZ) and Helmholtz Centre for Ocean Research Kiel (GEOMAR), Dublin Institute for Advanced Studies (DIAS), Real Instituto y Observatorio de la Armada (ROA), Instituto Dom Luiz (IDL, Portugal), Instituto Superior de Engenharia de Lisboa (ISEL) and Instituto Português do Mar e da Atmosfera, I. P. (IPMA).

- **Demersal 2021**

The oceanographic campaign Demersal 2021 main objective was to monitor the geographical distribution and recruitment indices of the main demersal species, namely hake, horse mackerel, blue whiting, mackerel, rays, cephalopods and other species of commercial interest, in the geographical area between Caminha and Vila Real de Santo António.

Under the National Biological Sampling Program (PNAB) and the Marine Strategy Framework Directive (MSFD) this campaign aimed to estimate the abundance/biomass and recruitment rates of hake, horse mackerel and other species of commercial interest integrating their geographical distribution; to collect data for biodiversity and marine litter indicators

(MSFD), and to characterize the oceanographic (temperature and salinity- with a device called CTD) of the species' distribution areas.

- **Crista Madeira-Tore**

The oceanographic campaign Crista Madeira-Tore had as main objective the scientific and technological research of the sea (see Decree Law No. 16/2016 of 9 March) integrating the axes of technological development for the economy of the sea and biotechnology and updating in the areas of research and technological development for the economy of the sea. The aim of this campaign was the elaboration of the reference situation of an area that integrates the geological complex Madeira-Tore including the adjacent area of the Gorringe bank through the use of the Mário Ruivo Research Vessel and the ROV Luso of the Portuguese Task Group for the Extension of the Continental Shelf (EMEPC).

- **HiperSea**

The oceanographic campaign HIPERSEA was carried out onboard the Mário Ruivo Research Vessel, between the 23<sup>rd</sup> of April and the 2<sup>nd</sup> of May 2022, in the areas of Lisbon and Setúbal submarine canyons. The main aim was to test the ability to capture living organisms on the seabed and in the water column at different depths, up to a maximum of 1000 metres, their transfer to a hyperbaric chamber at the surface and their maintenance in good physiological conditions. The hyperbaric system was developed under the HIPERSEA project by the consortium INESC TEC/ISEP, A. Silva Matos Metalomecânica, IPMA and CIIMAR. This solution will allow to bring living species to the surface without damage caused by different pressures and keeping them alive for further studies he developed hyperbaric system includes a mobile hyperbaric infrastructure that allows the collection of living organisms in the deep sea in conditions of high pressure, low temperature (or extremely high temperature, in the case of proximity to active volcanoes or hydrothermal vents) and reduced light, and an infrastructure that transfers them to another hyperbaric chamber which mimics the seabed surface environmental physical parameters relevant to maintaining the life of the species and functioning as an aquarium. This equipment contains components which control the chemical parameters, allowing the life of the organisms inside the hyperbaric system, such as, pressure, temperature, light, food, corrosion and salinity. The campaign was of major importance to demonstrate and validate the hyperbaric system, its characteristics and behavior. The

functionality and capacity of the system to capture living organisms from the sea bottom was validated. This first demonstration also provided information about the operation, launch and collection procedures, which will enable the system to be optimized in the future, for the new versions to be developed and the technology to be adapted to the needs of Portuguese institutions and the national reality.

- **Blueforest**

The BlueForests 2022 campaign, carried out by IPMA onboard the oceanographic ship Mário Ruivo Research Vessel between the 30<sup>th</sup> of May and the 2<sup>nd</sup> of June, aimed to collect sediment cores from the sea bottom for the indirect determination of the deposition rate of carbon (blue) sequestered by blue forests, transported to the middle continental shelf and deposited in fine sediment bodies. Two areas were selected for sampling, one of Sesimbra and the other off Olhão, in the shelf adjacent to Ria Formosa. Sampling was done by using a multicore sampling device between depths of 60m to 100m, approximately, in muddy substrate. The sediments were preserved in tubes at the temperature of 4°C and transported to IPMA, where the adequate processing will be done by the Department of Marine Geology and CCMAR, including: granulometry, determination of the content in organic carbon and carbonates, imagery and physical and chemical non-destructive properties (MSCL and XRF), analysis of microfossils (foraminifera and diatoms), and analysis of sed-DNA.

- **Crustáceos 2022**

The oceanographic campaign “Crustaceans2022” is carried out annually and the main objective is to estimate the abundance, spatial distribution, and length structure of fishery species (with emphasis on the crayfish and the white shrimp), as well as, the biodiversity, oceanographic conditions and marine litter characterization, between the continental slope of southwestern and southern Portugal.

This research campaign is part of the Data Collection Framework of the European Union, under the Common Fisheries Policy, and the information obtained is used in the assessment of fishery resources in the area and in the Marine Strategy Framework Directive.

- **Crista Madeira-Tore | Leg 2**

The oceanographic campaign CRISTA MADEIRA-TORE 2022 Leg 2, took place aboard the oceanographic Mário Ruivo Research Vessel with the main objectives of:

- Continue the baseline of the environmental conditions of the Atlantic Ocean in the Madeira-Tore Ridge region,
- Reinforce the capacity to acquire long continuous time series of the water column, and
- Improve the operational capacity in robotics and technology of operations at sea.

The campaign operated under 24h of data acquisition regime every day. The acquired data allow the quantitative and qualitative characterization of: plastics and microplastics on the sea surface, microplankton populations, oceanographic parameters of the water column, geological constitution of the bottom and biological communities.

- **Demersal 2022**

The Demersal research survey takes place annually, during 30 days in the last trimester of the year, covering the continental shelf of mainland Portugal, following a sampling plan with 96 bottom trawl hauls. The objective of this survey is to estimate the abundance, spatial distribution, and length structure of the populations of several species (such as horse mackerel and European hake). Additional data are also collected about biodiversity, oceanographic conditions (such as temperature and salinity) and marine litter (MFSD – Marine Strategy Framework Directive).

- **Demersal 2023**

Scheduled to start on October 2023.

When questioned about the costs and investments for each project, in order to major the investments, and its return, the IPMA's answer was general. The calculated cost for each project is the same: the cost of the vessel during the year divided by the days of the vessel on the sea.

The next chapter analyzes better this number in order to developed a better understanding on how to major the investment return to the society, and if it's possible to major something in this way.

## CHAPTER VI – EVALUATION OF PUBLIC POLICIES

### 6.1 FINANCIAL ANALYSIS

In order to be able to evaluate the potential of the ship, the most recommended analysis tool was the financial one. From the studies and research carried out throughout this work it can already be understood that the amount invested in the ship was €15,441,176, including the foreign capital, via EEA Grants and national capital, via government contributions.

Regarding the cost of the ship, the information provided by IPMA and which can be found in *Despacho* document (Despacho nº 2011/2020) is that the daily cost of the Mário Ruivo Research Vessel is €17,000 per day<sup>18</sup>. This cost per day is estimated since the expenses are calculated annually and divided by the days of the year. The cost of the ship on land, i.e., on days when it is not being used for research, is diluted on days when the ship is in research.

With the number closed, without distinction of personnel cost<sup>19</sup>, machining, maintenance, fuel, and others, the analysis can only be made based on the premise of a "cold" number. Thus, the present analysis only considers the daily value, without variations.

To understand how much the ship would already have returned on investment since it went into full<sup>20</sup> operation, it was necessary to analyze the number of days it was in operation. According to IPMA's own information, all the campaigns carried out by the ship are available on the official website<sup>21</sup>. Therefore, we have the following:

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<sup>18</sup> The predecessor ship to the Mário Ruivo, Norway, had a daily cost of € 9,000, however, the IPMA explains this cost difference with the level of crew qualification required to comply with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention), which made it impossible for the crew of NI Norway to transition to NI Mário Ruivo, and translates into higher daily costs.

<sup>19</sup> There was a challenge from the TCU, already overcome, regarding the hiring regime used for the members of Mário Ruivo, which can be read at: <https://www.tcontas.pt/pt/ProdutosTC/Relatorios/RelatoriosApuramentoResponsabilidades/Documents/2019/arf-dgtc-rel005-2019-1s.pdf>

<sup>20</sup> Full operation means the first trip for research.

<sup>21</sup> <https://mario.ruivo.ipma.pt/mario-ruivo/>

| Project             | Start      | End        | Days       |
|---------------------|------------|------------|------------|
| Demersal 2020       | 23/11/2020 | 22/12/2020 | 30         |
| EMSO-PT   Leg 1     | 24/05/2021 | 27/05/2021 | 4          |
| Crustáceos 2021     | 15/06/2021 | 05/07/2021 | 21         |
| UPFLOW   Leg 1      | 14/07/2021 | 10/08/2021 | 28         |
| Demersal 2021       | 22/09/2021 | 23/10/2021 | 32         |
| Crista Madeira-Tore | 20/11/2021 | 04/12/2021 | 15         |
| HiperSea            | 23/04/2022 | 02/05/2022 | 10         |
| Mar2020             | 16/05/2022 | 18/05/2022 | 3          |
| EMSO-PT   Leg 2     | 31/05/2022 | 02/06/2022 | 3          |
| Crustáceos 2022     | 08/06/2022 | 02/07/2022 | 25         |
| Oceantech           | 11/07/2022 | 13/07/2022 | 3          |
| UPFLOW   Leg 2      | 03/08/2022 | 05/09/2022 | 34         |
| Crista Madeira-Tore | 21/09/2022 | 08/10/2022 | 18         |
| Demersal 2022       | 13/10/2022 | 22/11/2022 | 41         |
| Demersal 2023       | 01/10/2023 | 31/10/2023 | 31         |
| Trident             | 15/01/2024 | 15/02/2024 | 32         |
| Pelago              | 01/03/2024 | 31/03/2024 | 31         |
| Crustáceos 2024     | 28/05/2024 | 18/06/2024 | 22         |
| Demersal 2024       | 01/10/2024 | 31/10/2024 | 31         |
| <b>Total</b>        | -          | -          | <b>414</b> |

Table 3 - Days of different research projects in the Research Vessel. Table made by Bruna Barreto for this dissertation thesis

Since the year 2020 the Mário Ruivo Research Vessel has been in operation for research for 414 days. From 23/11/2020<sup>22</sup> until 30/10/2024<sup>23</sup>, the period adds up to a total of 1,438 days. When comparing the days in operation with the days on land, one has the following:

|              |       |
|--------------|-------|
| Working Days | 414   |
| Days Off     | 1.024 |

Table 4- Working days and days off in different research projects in the Research Vessel Table made by Bruna Barreto for this dissertation thesis.

In percentage, it can be said that the Mário Ruivo Research Vessel is 29% of the days in use and 71% of the days off. To understand the cost of the days in use and the cost of the days off, the number of days is multiplied by the cost/day of the ship, considering the IPMA

<sup>22</sup> Date of the first foray into research, Demersal 2020

<sup>23</sup> Date of last survey scheduled for the year 2024

calculation is made regardless of whether the ship is on land or on the voyage. Therefore, the cost of the ship in use from the first research trip is €7,079,400. The cost to the IPMA of the stopped ship, since the beginning of the investigation is €17,510,400<sup>24</sup>.

## **6.2 PUBLIC POLICY ANALYSIS**

### **6.2.1 COURT OF AUDITORS DISCUSSION**

In 2018, a lawsuit was instituted<sup>25</sup> within the scope of the Portuguese Court of Auditors for the determination of financial liability under contracts for the acquisition of maritime services concluded by IPMA. The purpose of the action was to establish any financial liabilities relating to:

- The non-timely subjection to prior supervision of two of the aforementioned contracts (Cases no. 2987/2017 and 2988/2017);
- The full execution (material and financial) of two of the contracts before they are sent for prior supervision by the Court of Auditors (Cases Nos 2987/2017 and 2988/2017);
- The attribution of unlawful retroactive effect to one of the contracts (case no. 2988/2017);
- The possible fractionation of expenditure;
- The illegality in the adoption of the urgent public tender (Cases no. 2987/2017 and 2988/2017);
- Failure to comply with the legal rules governing expenditure, appropriateness and commitment in the budget and in available funds;

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<sup>24</sup> This calculation does not take into account the investments made by the Government of Portugal for the purchase of the ship.

<sup>25</sup> CASE No 6/2018 – ARF/1st Chamber

- The hiring of personnel without compliance with the applicable legal regime regarding the exercise of work in public functions."<sup>26</sup>

The questioning about the hiring of new crew, in addition to the IPMA currently staff, only for specific work at Mário Ruivo Research Vessel. The IPMA already had workers in functions considered similar, who previously worked in other ships, such in *Noruega*. However, according to IPMA "the level of crew qualification required to comply with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention), which made it impossible for the crew of NI Norway to transition to NI Mário Ruivo Research Vessel and translates into higher daily costs."<sup>27</sup> (NI Navio de Investigação means RV Research Vessel)

At the end of the calculation, the contractual obligations of the financing contract and all the obligations set out in Article 6.8 of the EEAFM Regulation<sup>28</sup> were considered to have been fulfilled by the Court of Auditors. Apart from the proposal for financial correction established and of low materiality, the results obtained in the audit allowed to conclude the reliability, regularity and legality of the amount audited. In the other hand, irregularities and illegalities were found in the process of hiring staff. However, IPMA was given only one recommendation to adapt the hiring model, without the investigation unfolding into denunciation or accountability of IPMA agents involved in hiring.

In the most recent Audit Report of the Court of Auditors for<sup>29</sup> approval of IPMA accounts for the year 2019, the Mário Ruivo Research Vessel was once again the target of appreciation by the public body. According to that report, "It was understood to include in the audit the analysis of the process of acquisition and transformation of the Ship Mar Portugal/ Mário Ruivo Research Vessel, since complaints relating to this process were filed with this

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<sup>26</sup>

<https://www.tcontas.pt/ptpt/ProdutosTC/Relatorios/RelatoriosApuramentoResponsabilidades/Documents/2019/arf-dgtr-rel005-2019-1s.pdf>

<sup>27</sup>

<https://www.tcontas.pt/ptpt/ProdutosTC/Relatorios/RelatoriosApuramentoResponsabilidades/Documents/2019/arf-dgtr-rel005-2019-1s.pdf>

<sup>28</sup>

[https://eeaGrants.org/resources?title=&field\\_resource\\_type\\_target\\_id=197?title=&field\\_resource\\_type\\_target\\_id=197](https://eeaGrants.org/resources?title=&field_resource_type_target_id=197?title=&field_resource_type_target_id=197)

<sup>29</sup> REPORT NO. 12/2023 – available at:

<https://www.tcontas.pt/ptpt/ProdutosTC/Relatorios/RelatoriosAuditoria/Documents/2023/rel012-2023-2s.pdf>

Court, in particular regarding the convenience and costs of the solution adopted." (Portuguese Court of Auditors, 2023).

After investigation, the agency understood once again that there was no material irregularity. According to the report "In view of the considerations put forward and it is not for this Court to question management options, except on the basis of the finding of illegalities or violation of principles, it is considered that, while recognizing the increased cost of the solution adopted, it was duly justified."

### **6.2.2 INVESTMENT RETURN**

Given the above, the quantitative analysis of the Mário Ruivo Research Vessel case is hampered by the lack of information in the available data regarding the cost of the vessel. The variety, even considered small, when it comes to a ship like this, makes a difference in the final analysis.

Regarding the financial investment in the ship, it can be observed that the initial investment in the ship is around only 15% of the cost that the ship represents so far for the Portuguese public budget. Since the national investment initially was €2,441,176, but the accumulated cost with the ship, funded by IPMA is in 2023 about €17,510,400<sup>30</sup>.

In the international protocol<sup>31</sup> signed with the EEA Grants, there is no forecast of financial return with Mário Ruivo Research Vessel for the EEA Grants. Therefore, it's no make sense to talk about financial return for the investment fund that invested in the acquisition and renovation of the ship.

This does not prevent the discussion around the cost of the ship to the Portuguese Public Treasury. Much has been questioned about the cost of acquiring and adapting the ship, as it is considered an old ship with outdated technology. However, the discussion was focused only on the initial cost, nothing was publicly discussed about maintenance, including qualified staff for this new type of ship. The Court of Auditors limited the field of discussion in the legality of contracting.

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<sup>30</sup> Considering only the days in land.

<sup>31</sup> <https://www.eeaGrants.gov.pt/media/1097/protocolo-38-c.pdf>

Observing and ascertaining these numbers in a cold way is what is feasible at the present time. However, the potential and life expectancy of the ship require a deeper cost analysis so that it is possible to calculate the return on investment in policies to aid the growth of marine research. One of the investment guidelines of the EEA Grants.

### **6.2.3 QUALITATIVE ANALYSIS**

Since the quantitative analysis is already compromised, the qualitative analysis is even more complex. But in this case, the difficulty lies in measuring the return of the projects led within Mário Ruivo Research Vessel for the development of the sea, in line with the objective of the program that is to increase value creation and sustainable growth in the Portuguese blue economy<sup>32</sup>.

In all, according to previous topics, the ship Mário Ruivo Research Vessel will complete the marking of 20 research projects by the end of this year, 2023. These were projects that contributed to the evolution and growth of different areas of research related to the sea. We can understand that the monetary value of these research is sometimes invaluable, they have an impact on the education, exploration and expansion of sea studies. Any calculation made with incomplete assumptions may sound unfair.

In addition to the projects made at sea, the Mário Ruivo Research Vessel also receives social projects when on land. In a visit made in person on the ship, it was possible to see a group of students doing a guided tour by the internal team of the ship. In this visit the students learned not only about the ship and its functions but also about possible future professional careers for those who would like to work on a research ship like Mário Ruivo Research Vessel. It was explained that these visits were mostly carried out by colleges that receive low-income students. It was notorious that that visit for many of them meant the opening of a life-changing possibility, perhaps never even imagined.

Furthermore, it's important to note that these social visits are not on the ship's official websites, but they should be. They are evidence that, in social matters, Mário Ruivo Research Vessel fulfills a role that belongs to the Portuguese state, to offer possibilities and an environment of educational enrichment to those who need it.

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<sup>32</sup> <https://eeaGrants.org/news/programme-agreement-signed-for-the-innovation-programme-in-portugal>

## CHAPTER VII – DISCUSSION

A healthy ocean is essential for maintaining the long-term exploitation of natural resources. The most efficient way to reach an acceptable level of sustainable development is to properly finance (public or private) initiatives focused on improving the management, science and the governance of the sea. There are already some public funds focused on the sustainable development of the ocean. Considering the importance and size of the ocean, the investments could be bigger and have better structure (including the legal regulation).

However, the investments and the creation of this type of fund, especially the public ones because they involve public money, must be done in a structured way. During the research, it was not easy to get information that should be public and easy to find such as investment sources, investment return projections, balance of all projects and investments and other relevant financial information regarding the EEA Grants investments.

The preservation of the ocean and the growth of the Blue Economy is an issue of highest importance for the world. It must be treated as a matter of State and as a matter of general private interest. However, the purpose for which the money will be applied cannot justify the lack of publicity regarding the origin of that money and also the audit of the use of this money by the beneficiary institutions. This sustainable growth of the investments and the legal safety instruments are essential for the duration of this type of financing.

During the research, to understand the supervision and compliance structure for the application of foreign investment in projects, it was possible to note that the National Focal Point and the Certification Authority act within the scope of the same Ministry, when they should supervise each other. And even if the EEA does not consider this a sensitive point, it must be agreed that it affects the independence of its performance.

Due to this lack of transparency, the discussion about the acquisition and restoration of the Mário Ruivo Research Vessel in Portugal engendered disagreements and complaints. The controversy revolves around such a robust investment in a ship considered old (built in 1986), with outdated technology compared to what it's common to see on the most advanced research market. Because of this, the Court of Auditors was called to audit the ship's investment contracts and also the personnel hiring contracts for the ship. Irregularities were found and IPMA was advised to adjust procedures to comply with current regulations.

The Mário Ruivo Research Vessel has been carrying out investigation and research expeditions since 2019, which have been all successful. From the social perspective of the acquisition, in which the main objective was to develop sea research and exploration mechanisms in a new sustainable manner, the acquisition of the new ship Mário Ruivo Research Vessel was a good strategy and a successful investment.

In the financial context of the analysis of the acquisition of Mário Ruivo Research Vessel, it can be seen that the total amount invested in the ship was €15,441,176, including foreign capital, via EEA Grants and national capital, via government contributions. In an analysis of public policies, considering the cost of the ship per day and comparing it with the number of days at sea, the projected accumulated cost of the ship, covered by IPMA, is €17,510,400.00.

There is no official document that demonstrates the ship's costs in detail. A cost analysis helps to determine whether a business model is profitable, in which case it would determine whether the investment was well allocated and whether it can be leveraged. This involves having access to data related to labor (in campaign and outside), fuel, ship depreciation, number of projects being applied and accepted, criteria, and everything that may involve the ship's efficiency. Furthermore, the lack of transparency in this data seems to be what brings more distrust to society and academia when it comes to the acquisition of the ship and its efficiency.

Regarding the social impact of the ship, it's truly intangible. Mário Ruivo Research Vessel periodically welcomes schools, mostly students from low-income families, so they can learn about the ship and opportunities for new professions. Students spend either the morning or afternoon on the ship and can learn about the history of the ship, the facilities and hear advice from those who work there. This initiative is not publicized, and it was only possible to find out because on the day of the visit to discuss this thesis, one of these school excursions was happening.

Portugal is a country that has always had a relationship with the sea. And being a point of foreign investment in this regard should be a reason for honor. This cannot be distorted by any type of easiness in injecting money from rich countries in oil exploration due to the lack of transparency in the investment process in the country.

The people who work and dedicate themselves on a daily basis on the Mário Ruivo Research Vessel are serious and committed people, committed to getting the best efficiency from the ship, as this vessel is what they were given. With the published data, it's necessary to analyze the costs and efficiency of the ship in order to reach the maximum potential of the program, increasing the number and quality of monitoring and research in the mid-Atlantic.

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