MISSION ATLANTIC

CANARY CURRENT UPWELLING SYSTEM: REGIONAL STRATEGIES FOR A SUSTAINABLE BLUE ECONOMY

POLICY EVENT SUMMARY
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INTRODUCTION

The Atlantic Ocean provides goods and services that support human health and well-being on a global scale, playing a central role in the Earth system. Hence, critical changes in ocean and ecosystem dynamics can have detrimental consequences on regional, national and global economies and communities.

The recent IPBES Assessment Report on the Sustainable Use of Wild Species estimates that more than 30% of wild marine fish stocks are overfished and unsustainable fisheries can cause damage to the marine environment in multiple dimensions, often leading to cascading effects on local economies. Socioeconomic developments driven by global changes and the climate crisis can also accelerate the loss of different ecosystem services limiting adaptive capacities in several regions[1]. Nevertheless, robust governance and collaborative efforts can effectively support the sustainable management of marine resources (both living and non-living), and thus enable us to address a number of the challenges we face in the ongoing development of the Atlantic Ocean. The need for improved collaboration across scientific disciplines and different levels of governance is especially pertinent in the context of growing interest and accelerating activities across blue economy sectors (e.g. sustainable tourism and aquaculture, access to marine sources of energy, green shipping).

It is therefore essential to develop knowledge on the status, drivers and dynamics of Atlantic marine ecosystems, across regions, to better support appropriate management actions at the necessary scales. This system approach can ensure the sustainable use of marine resources and the protection of the global ocean commons under present conditions and future developments. Additionally, a clear understanding of the challenges for marine ecosystems and their systematic assessments are needed to ensure sustainable planning of the development for marine and maritime-based activities (i.e., a sustainable blue economy).

The Atlantic is the largest sea basin for the EU, representing 36% of the EU blue economy gross added value and has increasing potential for cooperation between the EU and other global regions[2]. In this respect, the Atlantic sea basin can also leverage potential synergies with other EU strategies, and support provided for maritime cluster cooperation in northern Africa (e.g. Morocco, Mauritania)[3]. Knowledge, data and observations across countries, sectors and users of the sea should be integrated in a systems approach, which is able to identify indicators of ecosystem state, their changes over time and space, and to deliver assessments of risks and vulnerabilities of the regional socio-ecological systems under multiple pressures and future scenarios. Such systematic assessments can serve as a basis for a thorough analysis of the threats to marine ecosystem functioning and to inform robust and effective planning of maritime activities (e.g., towards an Integrated Coastal Zone Management and Marine Spatial Planning).

This policy event aimed to discuss this holistic approach in the context of an Integrated Ecosystem Assessment of the Canary Current upwelling system developed within MISSION ATLANTIC. This region is subject to major challenges including decline in marine living resources, degradation of habitats, deterioration in water quality, ocean warming, sea-level rise and acidification, increases in marine extreme events and other major threats linked to biodiversity loss. The presence of multi-scale governance (multi-national, nation-state, local authorities and Areas Beyond National Jurisdiction) and user groups (fishery, aquaculture, tourism, renewable energy, oil, gas, etc.) is indicative of a diverse assembly of stakeholders operating in a complex socio-ecological system, posing challenges and opportunities for new governance models on the use of the sea.

[1] ipcc.ch/report/ar6/wg2

[2] oceans-and-fisheries.ec.europa.eu/ocean/sea-basins/atlantic-ocean_en

[3] westmed-initiative.ec.europa.eu/westmed-maritime-clusters-alliance

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EVENT SUMMARY

The policy event promoted a dialogue on challenges and synergies to advance towards a common blue economy strategy in the Canary Current upwelling system with a focus on:

Science and technology to support the blue economy in Gran Canaria. *Joaquim Brito* introduced the role of science and technology in support of present blue economy developments in the region. A significant fraction of future economic growth in the region is linked to the blue economy, where some sectors are expected to strengthen their role (for e.g., those related to port activities and maintenance, tourism, fishery and aquaculture) while others are expanding (for e.g., the offshore renewable energy). It is important to have the capacity to deliver infrastructures and services to academia and industry to test new technology solutions supporting those economic activities and emerging sectors, and to tailor solutions to the specific needs of local users and reduce the risks associated with their upscaling. The focus is on emerging sectors like energy transitions, food security, digital transition, and a healthy ocean. In particular, the offshore wind energy sector is expected to increase five-fold by 2030, and 25 times by 2050, with the creation of new jobs and economic opportunities in addition to cascading effects on more classical activities like port operations and logistics. Observations can enable those economic activities and favour a digital transition, especially now that new platforms and sensors have reduced the cost of data collection. It is important to underline that technology development should go hand-in-hand with the development of supporting legal tools, large scale collaborations and social acceptance to create a viable innovation ecosystem around solutions for the blue economy.

Sustainability challenges and outlook. *Tarub Bahri* presented the activities of FAO CECAF (Fishery Committee for the Eastern Central Africa), an organisation that represents more than half of the total fishery production in the region. Stock assessment results show that data quality is concerning in some areas while for those stocks where enough data are available, there are clear signals of overexploitation. The challenges are the regional differences in data quality and availability as reflected by the few national research surveys carried out. This has also had an impact on the uptake of CECAF management advice by the different countries. Lack of data as well as a series of environmental and social drivers can undermine the sustainable use of wild species, as illustrated by the latest IPBES report presented by *Mary Gasalla*. However, robust and adaptive governance and the promotion of inclusive and participatory processes in management can enable sustainable use of several fish species. But still, while we have several indicators for ecosystem dynamics, we have a lack of indicators covering the socio-economic components whose changes can have large impacts on the wild species (e.g., changes in global trade and consumer habits). Other knowledge gaps in the management of wild species are related to assessment methods, models and scenarios, the use of indigenous and local knowledge and effects of multiple pressures.

Results of the systemic ecosystem assessment. *Marcos Llope* showed that fishing (industrial and artisanal) and shipping stand out as the current and primary human activities in the ecoregion, contributing to pollution (litter and contaminants) and extraction of marine species, and have been identified as main pressures. Climate change effects are prominent with direct consequences on coastal communities in terms of or livelihoods (migrating fish stocks), housing or agriculture (coastline erosion and salination of cultivated land as a result of sea-level rise). Emerging sectors, like oil and gas, should also be carefully considered.

Social conflicts and emerging issues. Although it was noted that Africa has enormous potential for a vibrant blue economy, the sustainable exploration of African seas is hampered by limited capacity building and training efforts as well as limited research and development (R&D) activities and inadequate technology capabilities, combined with insufficient investment in blue economy sectors. Accordingly, *Ismaila Ndiaye* noted that a major challenge in Senegal is: How to reconcile the exploitation of fishery resources and the exploitation of offshore hydrocarbons while taking into account the vulnerability of marine and coastal communities and ecosystems? *Babacar Diop* underlined that we need to take into account socio-economic challenges and the realities of local populations. The need to document the innovation generated to the actors at the base, in order to better develop a bottom-up approach in the analysis of the issues related to the blue economy and climate change.

Improving ocean observations. *Sylvie Giraud* presented how cost-effective and suitable technologies can improve the management and sustainability of fishery activities in the region. This was demonstrated by STARFISH 4.0, an EU co-funded EMFAF pilot project, led in collaboration with artisanal fishers in Mauritania. STARFISH 4.0 proposed an enabling solution to secure a robust and comprehensive fisheries control system to keep stocks healthy. 42 fishers had their canoes equipped with an affordable, solar, hybrid satellite/cellular vessel tracking system specifically designed for small vessels. Over twelve months, the system monitored fishing activities and automatically reported fishing tracks to shore, but also improved safety at sea through dedicated alerting services.

Cooperation and collaborative models. *Matteo Bocci* and *Mohamed Lemine Abdel Hamid* provided an overview of the WestMED initiative. Collaboration across countries is pivotal to ensure overall sustainability and long-lasting improvements. As discussed during the event, the role of maritime clusters can be central in supporting cooperation and uptake of sustainable innovation amongst local practitioners (authorities, businesses, associations, etc.). In this respect, it is also important to reflect and build upon advancements promoted in this area under the WestMED Initiative , as supported by the EU in cooperation with national authorities. Acting under such initiative, the WestMED Maritime Cluster Alliance has been essential in strengthening cluster cooperation across the region. More recently, a strong commitment has emerged to set-up clusters in Mauritania and Morocco as part of a broader 'Southern Roadmap '.
In this context, it was highlighted that Mauritania, like other countries of the 5+5 group, has engaged in the development of a national blue economy strategy, the establishment of a maritime cluster involving all stakeholders and raising awareness of national actors to the main challenges of preserving the sea. The work of maritime clusters should be considered as an important factor in fostering collaborative models, cross-sectoral as well as inter-stakeholders, for cooperation in the Atlantic - and in synergy with the WestMED.

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New opportunities from research, development and cooperation projects in the Atlantic. *Sergio Rossi* presented the Horizon Europe project "OCEAN CITIZEN" that is proposing a very ambitious, yet fully feasible, plan for coastal benthic marine forest restoration together with a solid business plan that will be applied for a long-term duration. Centred in Tenerife, Spain, where all upscaling restoration approaches will be executed, OCEAN CITIZEN will replicate this approach in four other sites across Europe. The engaged citizens will embrace new policy plans, promote awareness of the issues at stake, and propose solutions that support sustainable development throughout the entire process. OCEAN CITIZEN is an Atlantic-Arctic lighthouse, and is part of the EU Mission Restore our Ocean and Waters, which is supported by a collective support action coordinated by the Air Centre as introduced by *José Moutinho.*

Research and Innovation Alliances in the Atlantic. *Terry Schaefer* provided an overview of the implementation of the Galway Statement on Atlantic Ocean Cooperation (2013), the Belem Statement of Atlantic Research and Innovation Cooperation (2017) and the All-Atlantic Ocean Research and Innovation Alliance (AAORIA - 2022) followed by an update on the next steps towards the formal implementation of AAORIA. Opportunities for MISSION ATLANTIC to be a significant contributor to AAORIA in science and policy were also emphasised.

[4]westmed-initiative.ec.europa.eu

[5]westmed-initiative.ec.europa.eu/westmed-maritime-clusters-alliance

[6]westmed-initiative.ec.europa.eu/wp-content/uploads/2022/09/WestMED-Maritime-Clusters-Alliance-Malta-Roadmap-for-Southern-Clusters-18072022-published.pdf

REMARKS

This policy event was organised under the EU H2020 funded project MISSION ATLANTIC with the aim of establishing a dialogue around the development of a sustainable blue economy in the Canary Current upwelling system which is a region that is central for a range of maritime activities including fishery, aquaculture, tourism, renewable energy, oil and gas extraction, and transport. It is also a region that is very diverse and fragmented in terms of the governance, capacity and the management of the ocean resources.

The shared use of the ocean commons can create challenges in the sustainable management of the sea, but we are all very convinced that the only method to resolve potential conflicts is with an open and honest dialogue supported by transparent and knowledge-based science; a message that we would like to transfer loud and clear to all world leaders in an era of increasing global challenges, multiple crises and increasing geopolitical tensions. Such tensions undermine global dialogue and collaborative efforts, as climate and ecological crises are threatening our very existence on this planet.

To face global challenges, we need to start addressing local, tangible issues and provide best practice examples on how to act at a global level by involving everyone who has a stake in the sustainable management of the ocean commons. During this event, we discussed the case of gas extraction and processing in Senegal that is creating increasing concerns in the local population regarding the sustainable use of ocean resources. This activity also appears to have several impacts on different ecosystem components, hence we advise the use of a precautionary approach to respond to increasing energy demands from the region whilst also increasing protection and restoration measures for key ecosystem components (e.g., deep-sea coral reefs, essential fish habitats, marine protected areas) and social components (e.g., fishers and coastal communities) in the area.

While specific, this emerging issue (gas extraction and processing) also highlights the need to engage local populations to a greater extent, especially on decisions regarding the exploitation of natural resources, which should always be evaluated against sustainable ecological, social and economic conditions. Dialogue and stakeholder engagement are central in the Integrated Ecosystem Assessment cycle method developed in the context of MISSION ATLANTIC project. The IEA has been effective in delivering a systematic mapping of the linkages between human activities, pressures, and ecosystem components in the region, as well as in evaluating ecosystem vulnerabilities and risks under multiple pressures. Based on this, we advise to expand this approach to include stakeholders from neighbouring countries.

The IEA approach can provide the scientific basis to promote and advance collaborative efforts between academia, industry and policy makers, including those within the maritime cluster cooperation initiatives. International cross-sectorial cooperation should focus efforts on defining and developing strong equitable legal frameworks and necessary knowledge as accelerators of the sustainable blue economy.

Cooperation should also include scientific cooperation between boundary countries. This calls for decisive implementation of the All-Atlantic Research and Innovation Alliance with initiatives promoting collaborative scientific and technology excellences across all signatories and associated countries acting at local, national and regional scales.

Challenges come with opportunities, and now is the time to act for the development of an equitable and sustainable blue economy in this region, for the benefit of the whole Atlantic.


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PARTICIPANTS

Patrizio Mariani is Professor in Ocean Technology and leads the group on Observation Technology at Technical University of Denmark. His focus is on the development of methods, platforms and instruments supporting the next generation integrated marine ecosystem assessment. He holds a PhD in Marine Science and Engineering and a MSc from the University of Naples in marine environmental science. He is president and coordinator of EUROMARINE, a large European network on marine research, and the coordinator of the EU H2020 project MISSION ATLANTIC as well as PI in several other H2020 and Horizon Europe projects.

Joaquin Brito is the director of PLOCAN and interested in ocean science and technology. His primary motivation is to develop collaborations and share knowledge, technology and innovation in the Atlantic area, initiating new frontiers and discovering untapped marine and maritime opportunities to tackle global problems and create local value.

Marcos Llope is a researcher at Instituto Español de Oceanografía (IEO-CSIC), based in Cadiz, Spain. His research focuses on the development of Ecosystem-Based Management for the Gulf of Cadiz and the Canary Current, which is the case study he leads in MISSION ATLANTIC.

Matteo Bocci expertise includes "blue" innovation, research, cluster analysis and support, tourism and sustainable yachting, green shipping and shipbuilding value chains, sustainable aquaculture, marine renewable energy, and other marine-based and marine-related activities, as well as governance, sea basin strategy support, public and private financing support, enabling policy frameworks. He has been working in support to a sustainable blue economy across the EU since the Blue Growth Study developed for DG Mare in 2012. He has worked on several research and capacity-building assignments in support of a sustainable blue economy, across various EU sea-basins (Mediterranean, Black Sea, Baltic) and is expert in supporting sustainable development projects to access public grants and private investments.

Dr. Mohamed Lemine Abdel Hamid is a professor of macroeconomics at the University of Nouakchott (Mauritania). His work covers broad areas including macroeconomics, environmental economics, blue economy, value chain analysis, design and evaluation of public policies. For more than 10 years, Dr. Abdel Hamid has been involved in several strategic documents related to different economic sectors of Mauritania, including the development of national strategies for fisheries, livestock, and industry. Since 2019 Dr. Abdel Hamid has been involved in the technical assistance mechanism of the WestMED initiative and ensures the position of the National Hub of Mauritania.

Elba Bueno is manager of the Canary Islands Maritime Cluster, a non-profit association whose main objective is to promote the development and international competitiveness of the Maritime Sector of the Canary Islands, in turn increasing the business, economic and social fabric of the Canary Islands.

Sergio Rossi is a research scientist specialising in marine natural resources and biological oceanography. His primary focus is on global change indicators of stress in benthic populations as well as benthic wildlife conservation and restoration. Currently, he is Associate Professor at the Università del Salento (Italy) and Permanent Professor at the Universidade Federal do Ceará (Brazil). He is also the Scientific Director of Underwater Gardens International regenerative programs and currently coordinator of the iPlastic (JPI Oceans-Italy), MAF WORLD (COST Action CA20102) and OCEAN CITIZEN (Horizon Europe) projects.

Sylvie Giraud holds the position of Sales & Marketing Specialist in the Sustainable Fisheries Management Business Unit of Collecte Localisation Satellites (CLS). Her interest focuses on sustainable small-scale fisheries, aquaculture, seafood traceability/ecolabelling, fishing gear marking and social innovation driving behavioural change for the environment. She is experienced in co-design and user engagement methods to secure user buy-in from the very beginning. She is currently involved in several technological demonstration projects funded by the European Union with the roles of Project Manager, User Experience Specialist and/or Business Innovation leader aimed at delivering market-ready innovative products and services like space IoT-enabled connected fishing gears, affordable space IoT-enabled solar Vessel Monitoring System for small vessels, fisheries intelligence services.

Carlos Barrera is Head of Unit for Ocean Vehicles at PLOCAN. He is an oceanographer with 25-year experience in ocean-tech with a focus on autonomous observing systems and platforms. As well as technical and operational activities, he is also involved in R&D project-coordination, ocean governance initiatives and services management. Currently he chairs the EuroGOOS Glider Task Team, is board member of the Spanish Autonomous-Ships Working Group, delegate of The Maritime Alliance and

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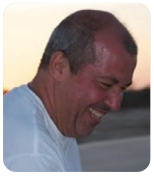
and coordinator of the PLOCAN Glider School program. Within the European project EuroSea, he coordinates the implementation of an international network of Uncrewed Surface Vehicles in support of global ocean observing capabilities.

Ismaila Ndiaye is a fisheries and aquaculture engineer, civil servant and head of the regional fisheries and surveillance service in Dakar-Senegal. He has conducted research on the biology of sardinella from the Senegalese coast. He is also the National Technical Coordinator of the Canary Current Large Marine Ecosystem (CCLME) in Senegal.

Babacar Diop is a sociologist by training and researcher. His work focuses on community approaches and analysis of the social impacts of the blue economy and local innovations to improve management practices. He works as a causal teacher at the University of Ziguinchor in Senegal, the Virtual University of Senegal and several private institutes in Dakar. He is a member of the collective Aar linu Bokk Senegal which is active in the transparency of the management of oil and gas resources to the local population.

Tarub Bahri is the current technical secretary of the Fishery Committee for the Eastern Central Atlantic (CECAF) at the Food and Agriculture Organisation of the United Nations (FAO). She has a background in fisheries biology, marine ecology and statistics. She has dealt with fisheries management, implementing the Ecosystem Approach to Fisheries in marine and inland fisheries in FAO and is also the coordinator of the FAO Fisheries and Aquaculture Division climate change work.



José Moutinho is a Biologist, with a bachelor's degree in Zoology from the Federal University of Rio de Janeiro. He also has a degree in architecture from Santa Ursula University in Rio de Janeiro, with equivalence conferred by the Faculty of Architecture of the Technical University of Lisbon and a Master of Science in Engineering and Technology Management from the Institute of Innovation, Technology and Development Policies (IN+) of Instituto Superior Tecnico (IST). . Currently he is the Chief Business & Network Officer for the Atlantic International Research Centre (AIR Centre).

Terry Schaefer is a former program manager for the NOAA Research International Activities Office. There he supported the US Co-chair of the Galway Statement on Atlantic Ocean Cooperation (NOAA Assistant Administrator) and coordinated and supported US scientific engagement in the Atlantic Ocean Research Alliance (AORA) Working Groups as well as several Horizon 2020 projects. Terry also provided support for US engagement in the All-Atlantic Forums and preparations for the All-Atlantic Ocean Research and Innovation Forum in Washington, DC in July 2022 that culminated in the signing of the All-Atlantic Ocean Research and Innovation Alliance (AAORIA) Declaration by officials from Argentina, Brazil, Canada, Cabo Verde, the European Union, Morocco, South Africa, and the United States. Terry continues to serve as a member of the Advisory Board for Mission Atlantic.

Maria Gasalla is an expert in marine systems, natural resource management and local communities' behaviour and values. She is Coordinating Lead Author of the IPBES Sustainable Use Assessment and a member of the Taskforce on Scenarios and Models. She is Professor of the University of Sao Paulo at the Oceanographic Institute (Brazil) and head of the Fisheries Ecosystems Laboratory (LabPesq). She is also a member of the IUCN Fisheries Expert Group, Commission of Ecosystem Management.

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