



Realising the potential of the Outermost Regions for sustainable Blue Growth

Executive summary

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Poseidon Aquatic Resources Management Ltd**
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1 Needs and objectives of the study

This study aims at contributing to the implementation of the Integrated Maritime Policy in the nine Outermost Regions (ORs) of the European Union (Guadeloupe, French Guiana, Martinique, Réunion, Mayotte, Saint-Martin, Madeira, the Azores and Canary Islands) and their related sea basins (Caribbean-Amazonia, south-west Indian Ocean and Macaronesia). Its main purpose is to identify opportunities for sustainable growth in the blue economy (Blue Growth) in each of the basins, by covering four main areas:

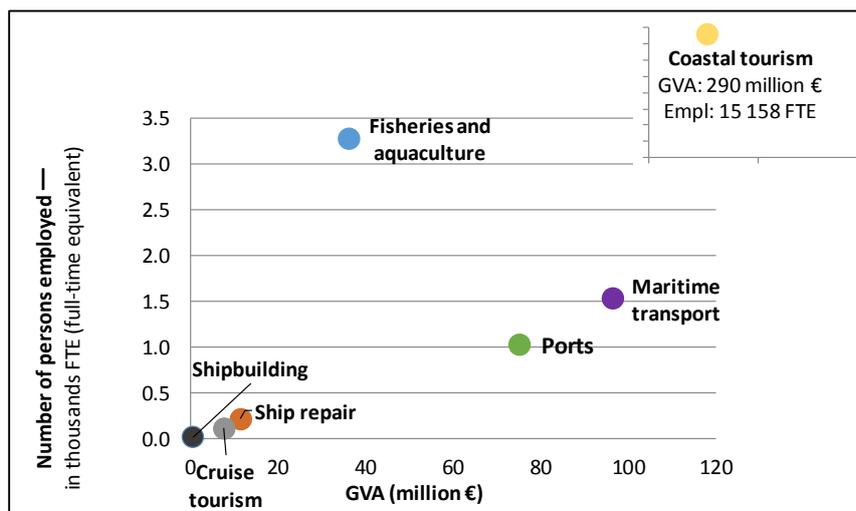
- the **state of play**, which describes the qualitative and quantitative aspects of the blue economy of the ORs and identifies relevant flagship projects;
- the identification of potential **new maritime activities** expected to contribute to Blue Growth in each of the ORs;
- a **gap analysis** of required skills, infrastructure, research and data, and recommendations for appropriate actions (at public and private levels) expected to help fill these gaps; and
- the provision of up-to-date insights and evidence on the new **growth potential** that should help understand the economic and social development process within the maritime sector, including analysis of maritime activity trends, identification of strategies to improve the competitiveness of maritime activities, and the fostering of the role of ORs within the overall EU cooperation framework in the maritime sector.

2 Main findings and conclusions by sea basin

2.1 Caribbean-Amazonia (Guadeloupe, Martinique, Saint-Martin, French Guiana)

Maritime-based economic activities contribute significantly to the overall economy of Caribbean countries. Of these, as depicted in Figure 1 below, **coastal tourism, cruise tourism, shipping** (maritime transport and ports) and **fishing and aquaculture** play a major role in the overall Caribbean economy, given that (i) all these activities have been identified in all countries and ORs and (ii) they present the highest level of development in almost all territories. Two activities currently at a pre-development stage present considerable growth potential for the near future, and could create important job opportunities and value added for the sea basin economy: **renewable energy** and **blue biotechnology**.

Figure 1 – Main maritime activities in Guadeloupe, Martinique and French Guiana



Source: our elaboration on 2014 data from INSEE— Institut national des statistiques. For more details, see related Annexes; no data was available for Saint-Martin.

2.1.1 Fisheries and aquaculture

The fisheries sector of the Caribbean-Azononia basin countries assessed in this study is an important component of their blue economy. It represents a significant source of nutrition, employment and foreign exchange, contributing also to social and economic stability. With respect to aquaculture, a developing aquaculture industry is found mainly in Suriname, Trinidad & Tobago and Martinique (15 aquaculture sites in operation in Martinique in 2015), and to a lesser extent in Dominica, St. Lucia and Guadeloupe (5 sites). For other territories, aquaculture remains at an experimental stage.

For these activities, the same gaps were identified in all four ORs, namely: lack of staff with basic education and entrepreneurial capacity; insufficient infrastructure facilities; ageing fleets; limited physical space for aquaculture projects; insufficient scientific knowledge about marine resources to carry out stock assessments; difficulty to access credit (also linked to the lack of collateral for bank loans) and absence of interest of investors or banks to the fisheries sector; lack of governance, as countries in the region have not formally adopted joint fisheries management plans.

Several actions are therefore recommended. First, public-private consultations for exploring the feasibility of the fleets' renewal should be launched, involving both private and public stakeholders. Since fleet renewal is not covered by the EU's Common Fisheries Policy (CFP), alternative funding sources should be investigated. Fleet renewal should be linked to an improvement of guarantee systems and fiscal

mechanisms allowing access to credit. Moreover, regional cooperation for the management of fishery resources should be reinforced, improving the scientific knowledge, and promoting cooperation between research institutes and administrations in the basin. Educational programmes for the sector should also be established, based on the specific training needs of each OR. Training fishermen on how to diversify their activity — e.g. through 'pesca-tourism' — could support the increase of the profitability of the activity as a whole. As regards aquaculture, guarantee systems and fiscal mechanisms should be developed and made available to project initiators to allow them invest in the sector. Furthermore, analysis of infrastructure needs and related equipment should be carried out, elaborating a strategic plan for fishing port infrastructure. Finally, as regards the knowledge about marine resources, research capacities should be reinforced, developing a regular monitoring of stocks and catches and establishing robust technical support and knowledge transfer to fishermen.

2.1.2 Coastal tourism

The wider tourism sector, including non-maritime activities, is a key part of the economy of most countries of this sea basin and around one quarter of the population in the Caribbean-Azononia is directly or indirectly employed in the sector.

The main gap identified for this activity concerns human resources and knowledge, namely a lack of relevant skills and related research. Therefore, entrepreneurial capabilities should be enhanced by setting up links between the industry and education systems. However, investments are also needed for improving services in the marinas and to enable hotels to achieve international standards.

An example of best practices: the Caribbean Large Marine Ecosystem Project

The objective of this project is to help participating countries to improve the sustainable management of their shared living resources through an ecosystem-based management approach. Results achieved were the development of a strategic action programme for sustainable management and the adoption of a shared vision of the countries involved regarding the priority interventions, reforms and investments. Data relating to fisheries, biology, pollution and socio-economics were gathered and formed the scientific basis for the elaboration of the programme of actions. Furthermore, a regular monitoring of the state of play of the project goals has been developed.

The project is replicable in other contexts where marine resources need to be monitored and assessed.

The Caribbean Sustainable Tourism Policy Framework is an opportunity for further developing tourism and cooperation within the region: it could be used by central administration, supported by tourism organisations and natural parks' management authorities, to promote ecotourism models that have the potential to limit the impact of mass tourism on the environment and to harmonise tourism-related taxation.

As with many areas, tourism in the ORs depends on good levels of transport infrastructure and air connections. Services in marinas and on land are generally insufficient, while hotels often do not meet international standards. Furthermore, financial resources dedicated to the promotion of EU's ORs as a tourism destination have declined. In general, it is suggested to support the accommodation sector through private investment, by creating adequate investment conditions (i.e. simplified administrative procedures and good infrastructure) considering that all ORs in the area possess adequate assets (e.g. attractiveness of coastal areas) for attracting these investments.

Synergies between cruise and coastal tourism should also be improved all over the region. Specifically in Saint-Martin, a growth driver could be the adoption of the regional scheme for the development and planning of tourism activities developed by the local authority (*Collectivité de Saint-Martin*), adopted for 2013-2020.

2.1.3 Cruise tourism

With approximately 24 million cruise passengers in 2014, cruise tourism is the second largest tourism-related activity in the sea basin (by arrivals). In fact, in that year the Caribbean area in general was the most visited cruise destination in the world. It has nevertheless to be noted that cruise tourism itself contributes relatively little to the local economies. Indirect positive effects of the activity on businesses along the supply chain are generally bigger than positive direct effects of the activity itself, increasing therefore the impact of cruise tourism on local economies.

The main growth driver is represented by the synergies that could be created with coastal tourism and port services. In fact, all ORs of the sea basin lack an organised on-land offer for cruise tourists and some ORs do not have adequate infrastructures to welcome large cruise vessels. Furthermore, access to the city centres and to other touristic areas is inadequate and requires investments for developing appropriate transport connections.

Overall, the development of a regional cruise strategy shared by both private and public stakeholders could address local needs for: (i) improving the operating conditions of cruise lines, (ii) advocating stricter environmental standards for cruise operations, (iii) diversifying products (premium vacations, special cruise options, etc.) taking into account the capacities of ports in terms of infrastructure, and (iv) increasing synergies between the cruise industry and coastal tourism in each territory. Furthermore, investments should be directed to the improvement of the attractiveness of the waterfront in the different territories.

The development of cruise industry would benefit businesses linked to other activities in each territory (in particular port services). Larger synergies between cruise and coastal tourism would also increase the impact of cruise tourism on the territories.

2.1.4 Shipping

The insular nature of most territories in the sea basin is reflected in the importance of ports and maritime services for trade, especially for the import of manufactured articles to satisfy the demand from locals and tourists alike.

The main gap identified consists in the existence of out-of-date labour practices, resulting in inefficient and dangerous working conditions in ports all over the sea basin. Moreover, some ports (St. Vincent, Grenada and Antigua) have inefficient terminal designs, limited space for container traffic and outdated cargo pier structures — which restrict operational efficiency and cargo capacity substantially. The lack of skilled staff is a serious gap and impacts maritime security, cargo handling, ship planning and logistics management.

The main barrier to growth is financial: the only source of funding is public and not always sufficient for the required investment. Nonetheless, thanks to public funds from the European Regional Development Fund (ERDF), the Conseil Régional and the French State, important port infrastructure investments were made in the analysed ORs (except for Saint-Martin). In addition to public commitment, another driver that could boost shipping in the area is the strategic plan of the Caribbean Community (CARICOM) for maritime transport service, as it may reduce transport costs through the simplification of administrative procedures and efficiency improvements at sea basin level.

Setting up a network among the territories for collaborating and sharing experiences and know-how could also support the development of the activity, especially if it focuses on the reduction of competition and the development of complementarities among the ports. Moreover, ports' efficiency should be enhanced by stimulating joint investments by all private and public port operators that move away from classic logistic models and implement technology and IT applications for tackling challenges such as the increasing size of ships and demands for enhanced security and safety.

2.1.5 Marine renewable energy

Marine renewable energy in the basin is at a pre-development stage. However, assessments conducted in the context of the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) indicate a significant potential for wind energy for some CARICOM member States. Further on-site feasibility studies on offshore wind potential as regards the community impact, the economic cost and the environmental footprint are foreseen in the next years under the umbrella of the C-SERMS. Future actions within the CARICOM States will largely depend on the results of these studies.

In terms of ongoing work on marine renewable energy in the basin, the lack of cooperation between the different territories results in a substantial duplication of research effort. For this reason, the path initiated by CARICOM Member States to develop a cooperation framework for data sharing and the exchanging of best practices and investment sources should be strengthened and pursued further.

2.1.6 Blue biotechnology

The marine biodiversity in the Caribbean Sea — one of the highest in the world — represents an abundant but underutilised resource. While in the past a (limited) number of drugs has been developed from organisms found on coral reefs in the basin, namely antiviral drugs and an anticancer agent, there have been no recent developments. The most relevant barrier to growth is at present limited research capabilities, and the fact that more specialised training is not available locally.

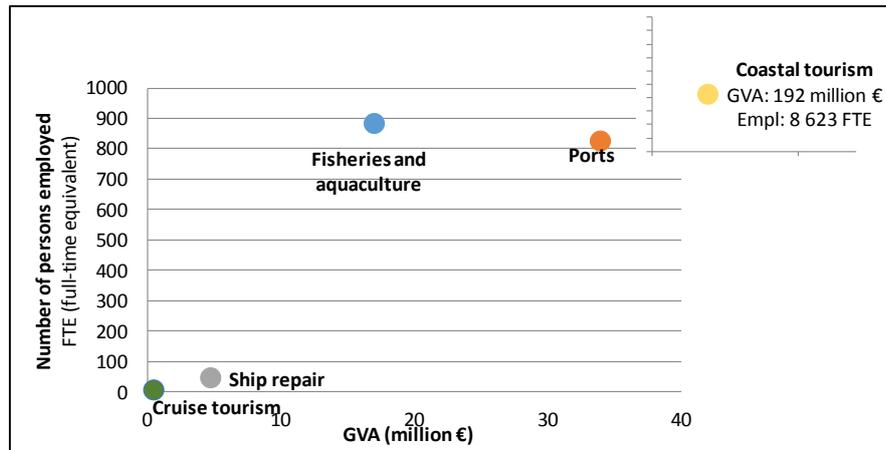
Blue biotechnology in the basin is largely dormant. We observed that only few stakeholders are currently involved in related research and development (R&D) in the basin, namely universities, research institutes and private companies in Martinique and Guadeloupe. The establishment of regional facilities, such as biological resource centres, should be considered for the Caribbean-Amazonia basin. Furthermore, developing strategic partnerships and international collaboration with local and EU academia and pharmaceutical companies could offer opportunities to achieve strategic, scientific and economic gains from the largely unexplored resources of the Caribbean region. To foster research into developing bio-resources in the ORs, calls for projects to support related R&D could be launched by local and central administrations.

2.2 South West Indian Ocean (Réunion, Mayotte)

In the south-west Indian Ocean, **coastal tourism, shipping** (maritime transport and ports) and **fishing and aquaculture** play an important role in the overall local economy. These activities have been identified in all countries and ORs and have reached a high level of development in almost all territories. While these three activities showed important potential in terms of jobs opportunities and value added, three activities have been also identified at a pre-development stage, showing growth

potential in the near future: **cruise tourism, renewable energy** and **blue biotechnology**.

Figure 2 – Main maritime activities in Réunion



Source: our elaboration on 2012 data from INSEE. See chapter 1 of Annex 6 for more details.

2.2.1 Fisheries and aquaculture

Regarding marine aquaculture in the basin, red drum fish is currently produced in Mauritius. It is no longer produced in Réunion (a hatchery is still operating there with public support) and Mayotte. In the latter, local authorities are trying to investigate the possibility to relaunch the production by supporting the recruitment of a local manager, but the financial feasibility of the operation remains a challenge as does the general lack of skilled local technicians.

Regarding fisheries, an important migratory route of tuna passes through the sea basin, with the Somali basin to the north and the Mozambique Channel to the west being key fishing grounds. In Réunion and Mayotte, fishing consists of both industrial and artisanal activities, targeting pelagic and reef fish; a toothfish fishing fleet is also active from Réunion, using it as a base to land fish caught in French Southern Lands. Scientific knowledge about the status of stocks in the sea basin, especially non-tuna stocks, needs to be improved. In addition, many fishermen lack business skills, and both the workforce and the fishing fleet are ageing.

Another gap, identified specifically for Mayotte, refers to the competition between vessels that comply with EU standards for working conditions and safety on board and boats that have a provisional derogation from the obligation to comply with these standards. The latter fleet should (continue to) be modernised by vessel owners and aligned with EU safety rules. Local fishing operators also demand that fishing resources in Mayotte waters be exclusively caught by EU fishing vessels in conformance to the CFP.

For Réunion, the risk that the industrial fishing sector disappears in the medium term due to higher operating costs compared to neighbouring countries poses a serious problem. Together with local authorities, local operators investigate ways to remain competitive in addition to the current EU sectoral support through the European Structural Funds Operational Programmes for outermost regions. For instance, operators involved in longline tuna fishing wish to investigate additional financial and fiscal public mechanisms to renew the ageing fleet, aware of the substantial investment required and the overall CFP rules forbidding public subsidies for fleet renewal.

At sea basin level, fisheries management and the sustainability of the fisheries could be improved by a better monitoring of local fish stocks (covering both tuna and non-tuna species and straddling stocks), the status of many of which is still unknown. The measure should be progressed by the Indian Ocean Tuna Commission (IOTC) for tuna species and by the Southern Indian Ocean Fisheries Agreement (SIOFA) for non-tuna species.

2.2.2 Coastal tourism

Tourism is a key economic activity in both the Seychelles and Mauritius, and to a lesser extent in Madagascar and Réunion, whilst it is only marginal in the Comoros and Mayotte. In Réunion, the tourism offer is broad due to the varied landscapes that make the island suitable for land-based activities, such as hiking, but also for coastal and maritime activities. As concerns Mayotte, the sector is marginal but currently undergoing actions to develop cruise tourism and ecotourism (the entire economic exclusive zone is a marine protected area).

Coastal tourism, however, is hindered in both ORs by the lack of quality accommodation that meets the expectations of international tourists. In particular, Mayotte lacks accommodation in areas other than the main towns. The lack of an adequately skilled workforce with basic knowledge of foreign languages and the high costs for reaching these destinations are barriers to the growth of this sector in both ORs. Additionally, over the last few years Réunion has had to deal with repeated shark attacks on surfers and swimmers that discourage tourists from visiting the island.

Nonetheless, significant drivers for blue growth are represented by the exceptional biodiversity in the basin, which in the case of Mayotte is protected through a marine protected area. Therefore, the development of forms of ecotourism, activated by local administrations (e.g. the Comité Départemental du Tourisme de Mayotte) and private stakeholders, could represent useful models to safeguard this natural resource by pointing to high end tourism and limiting the impact of mass tourism on the local environment. Furthermore, in addition to English and French, staff in the sector should be trained to acquire basic skills in Chinese and Russian, as these are the mother tongues of most of the foreign tourists visiting the sea basin.

Finally, one specific action is suggested for Réunion to be coordinated by public authorities and involving private actors: namely the creation of a 'whale sanctuary' for enabling whale watching as the waters of this OR are a transit zone of whales' migratory routes and also a breeding and calving area.

2.2.3 Cruise tourism

At sea basin level, international cruise tourism is currently taking place, offering round trips of the islands and connecting the Seychelles, Mauritius, Réunion, Mayotte and Madagascar. Given this interconnectedness, we recommend adopting an integrated approach for developing the sector in the whole region. It is also important to improve the related tourism supply chain in Réunion and Mayotte, ranging from the skills of staff working in tourism to more and better offers of activities on land for cruise passengers. In this context, to better integrate cruise tourism with coastal tourism, the variety of landscapes and the abundance of the local biodiversity could be harnessed to offer competitive packages to cruise tourists during their stopovers. In addition, the maintenance and upgrading of port and quay infrastructures should not be neglected, as these are not adequately managed in most of the sea basin. These measures should be activated by the IOC, and supported by national tourism associations and port authorities through a regional organisation representing them

An example of best practices:

the regional conference on blue growth

In December 2016, the Indian Ocean Commission (IOC) in partnership with Réunion (France) organised a regional conference on blue growth for the purpose of developing regional cooperation in the area within maritime sectors. Several recommendations resulted from the conference among which:

- Strengthen cooperation between the IOC and the United Nations Economic Commission for Africa;
- Support the 'whale road' project and other actions aimed at developing 'ecotourism';
- Support the exchange of data, expertise and lessons learned in renewable energy and ecosystem management issues;
- Strengthen port activities for supporting other maritime activities, including responding to the growing demand of cruise tourism in the sea basin; and
- Continue improvements and increases of regional connectivity at air and sea levels.

The activity is considered a milestone since it triggered a cascade of EU and French initiatives within the blue economy in the area.

(for instance through the Cruise Indian Ocean Association and the Indian Ocean Port Association).

2.2.4 Shipping

The South West Indian Ocean region has an advantageous position along the main maritime freight routes from Asia to Africa. Marine transport is also a key sector within the basin itself, where connectivity is required between islands in their own waters, with other island nations and with countries on the continents beyond. In this context, the main gap we identified is in the weak short sea shipping in the basin that hinders easy exchanges between countries in the region.

A gap in Mayotte regards the limited generational turnover within the sector: because Mayotte became an OR only fairly recently, it is now subject to visa requirements that make it difficult for local stakeholders to hire experts from abroad to train staff. Another barrier in Mayotte is the lack of certification — in line with the International Ship and Port Facility Security Code — of the Longoni port as a recognised safe port, which hinders the development of international shipping. A gap identified in Réunion is the poor availability of local specialists to understand and assess the environmental impacts of tropical ports. This situation is worsened by the fact that national regulations are not adapted to the tropical environment: Réunion has for instance naturally high concentrations of nickel in its soil, which are higher than in metropolitan France, but which have been judged as 'acceptable' by the authorities in charge of the health risks assessment. These gaps slow down the approval of port expansions or upgrade during environmental impact assessments stages.

2.2.5 Marine renewable energy

With all territories in the sea basin largely dependent on imported fuel for power generation, there has been considerable interest in solar photovoltaic energy and wind power development, including marine wind farms. Seawater air conditioning is being developed in Réunion and showing potential in Mayotte. However, two main gaps were identified for the diversification of such activities: a lack of skilled local staff and technology that is inadequate for cyclonic conditions. To develop more suitable technologies, it is necessary to collect more data at sea, identifying sites for developing pilot projects and ensuring the development of productive capacity. Related R&D efforts are already supported by the Indian Ocean Commission (IOC), and with the renowned Laboratory for the Study of the Atmosphere and Cyclones (LACY) already present in Réunion, the island is in a good position to develop as a hub for experimental research in difficult environments. In anticipation of rapid development of marine renewable energy technologies internationally, and despite several failures of pilot projects, public authorities should try to attract private investors (for R&D projects at first). This task should be carried out ideally in collaboration with the marine renewable energy cluster in Réunion (Temergie).

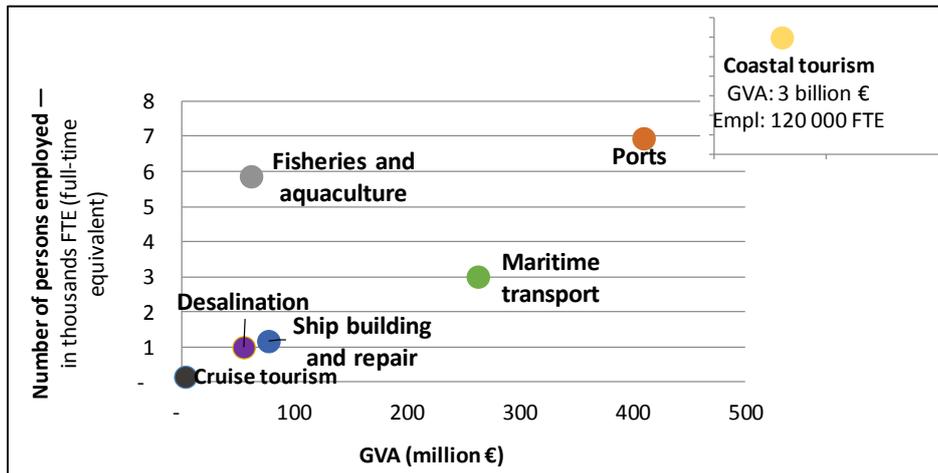
2.2.6 Blue biotechnology

Within the sea basin this sector is most advanced in Réunion, where the research platform for biotechnology and innovation of the Cyclotron Réunion Indian Ocean (CYROI) operates. However, the sector is still only at a developmental stage, and the gap analysis revealed a lack of a robust tool to transfer and share knowledge, innovative ideas and information between the different activities' supply chain stages (raw material production, R&D, industrial production). While related organisations already exist, their integration into a maritime research hub should be investigated, based on earlier proposals by Réunion's Regional Council. Furthermore, collaboration with the private sector should be improved, considering its possible access to funds from both the EU and the IOC, and its capacity to attract private investments. In this regard, the fact that the sea basin is not currently covered directly by public funding possibilities for blue biotechnology is a serious barrier. Therefore, local authorities and the IOC should seek support beyond the ERDF, for instance from development banks such as the World Bank.

2.3 Macaronesia (Canary Islands, Madeira and the Azores)

In the Macaronesian sea basin, maritime-based activities constitute the backbone of the local economies. Of these, **coastal tourism, cruise tourism, shipping** (maritime transport and ports) and **fishing and aquaculture** have been identified as playing a pivotal role and are highly developed. Two activities are at a pre-development stage and show a remarkable growth potential for the near future: both **renewable energy** and **blue biotechnology** could create important job opportunities and value added for the sea basin economy.

Figure 3 – Main maritime activities in Canary Islands, Madeira and Azores



Source: our elaboration on 2014 data from Instituto Nacional de Estadística (INE), Instituto Canario de Estadística (ISTAC) and Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente (MAPAMA) for the Canary Islands and from Instituto Nacional de Estadística (INE) for Azores and Madeira. For Shipbuilding and repair data refer to 2013. For more details, see chapter 1 of Annex 12.

2.3.1 Fisheries and aquaculture

Commercial fishing has a long tradition in Macaronesia, where it is characterised by the predominance of small-scale activities. However, as in the other basins, in Macaronesia, the sector faces barriers in terms of slow generational turnover and of fishermen that lack necessary skills. Moreover, in all ORs in the basin the sector suffers from poor access to funding and lack of investment. Finally, the lack of effective monitoring and control in the sea basin makes it hard to deter illegal, unreported and unregulated fishing (IUU).

For the three ORs, the following specific gaps emerged: in the Canary Islands the sector has to cope with high transportation costs due to the remoteness of the islands and it is financially highly dependent on the European Maritime and Fisheries Fund (EMFF); in Madeira the limited scientific knowledge of the fish stocks and the size and age of the vessels pose challenges for the sector; and in the Azores challenges are the lack of facilities to process fish (other than tuna), as well as outdated auction markets and landing places, and the inadequacy of existing traceability and control mechanisms, especially for monitoring recreational fishing. With regards to the latter, the high number of recreational licenses, e.g. in Canarias, make control activities challenging. Some of the catches may reach the consumer outside the formal commercialisation channels e.g. sold directly to restaurants and hotels. Other modalities through which illegal catches enter into the market are professional fishing with forbidden nets or in forbidden areas. Undeclared catches negatively affect stock assessment, while illegal activities constitute unfair competition for formal operators.

Throughout the basin, it is essential to strengthen coordination with Regional Fisheries Management Organisations (RFMOs), namely the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Fishery Committee for the Eastern Central Atlantic (CECAF), to improve monitoring, control and surveillance in order to reduce IUU fishing. It is also important to develop Maritime Spatial Planning (MSP) in

the basin as several maritime activities are being carried out at the same time in a limited space. Furthermore, the issue of fleet renewal should be tackled, as well as the lack of management skills that keeps fishermen from diversifying their business. In the Canary Islands, the sustainability of exploiting deep-water species could be explored, and in Madeira synergies with tourism (e.g. pesca-tourism) could be exploited.

With regard to aquaculture, the waters of the archipelagos offer good conditions for the development of this activity as they have the right temperatures throughout the year. However, gaps that we identified relate to the pending approval of the Management Plan for Aquaculture in the Canary Islands (PROAC) and to administrative hurdles for establishing operations, which is a key problem also in Madeira. An additional difficulty is in treating fish diseases due to the cost of importing veterinary drugs.

We also identified significant growth drivers: stakeholders in the Azores could leverage the 'Azores brand' to market locally caught or produced seafood, and the 'accelerated licensing procedure' for aquaculture operations in the Azores offers good investment conditions. Furthermore, in the Canary Islands there are several species with great potential for future use in aquaculture. Our recommendations for the aquaculture sector are therefore to optimise regulations for facilitating investments and obtaining licences, and to improve access to veterinary drugs, e.g. through contracts with feed providers.

2.3.2 Coastal tourism

Tourism, which goes beyond coastal tourism as it includes many non-maritime activities, has proved its potential all around the sea basin, where it is a well-established activity. In the Canary Islands and in Madeira in particular, it accounts for a high share of the local economy and employment. Taking advantage of the marine environment and resources and of the islands' coastal culture, coastal tourism in particular could be further expanded by offering more nautical activities (e.g. yachting), as well as whale and bird watching, pesca-tourism or marine gastronomy.

Remaining gaps that we identified concern both human resources and tourism infrastructure. For instance, qualified staff is limited due to a lack of cooperation between industry and the educational system; the accommodation sector is heavily indebted; and mooring places are missing in the marinas, especially for larger yachts. Moreover, satisfying the demands for energy, drinking water and waste disposal resulting from increases in tourism in a sustainable way poses further challenges to local authorities and port management bodies.

To address these gaps, vocational training schools such as the 'Sea School' of the Azores could host life-long learning courses that are specifically tailored to blue economy activities. It is also fundamental that local authorities ensure a balance between developing new tourism activities and creating related facilities on the one hand, and the protection of the environment and its resources on the other, e.g. by developing ecotourism. Due to its broad geographic coverage, the Macaronesia Maritime Cluster is well placed for leading such an initiative.

Otherwise, the geography and environment of the islands in the basin themselves present important drivers to the growth of the sector. For instance, the location of Azores makes them an ideal stopover for yachts on cross-Atlantic trips, and in the

An example of best practices:

Marca Azores

The Marca Azores is a brand aimed at promoting and valorising Azorean products in domestic and foreign markets. Furthermore, by investing in the different sectors, it aims at increasing the visibility, popularity and consumption of the products and services at the international level, thus promoting the expansion of the export-based economy.

The Azores brand has given its label to around 1 500 food products, services, establishments and crafts, leading to an increase in sales of goods and services.

The practice proved to be innovative and achieved good results so that it will continue in the future. The practice of branding a product or service with a local label is transferable and reproducible in other contexts.

Canary Islands the marine environment is an element that could still attract more visitors in addition to the new cultural attractions that are developing in the region.

2.3.3 Cruise tourism

Cruise tourism also has a role to play in all the three ORs in the sea basin, especially to the extent that it can contribute to offsetting the seasonal cycles of coastal tourism. Whilst cruise tourists only do short stays on land, unlike coastal tourists who stay for days or even weeks, their numbers are nevertheless significant (for instance in the Canary Islands in 2015 there were 2.2 million, about 16 % of all tourists). However, one challenge, among others, is the improvement of 'urban' services, such as accessibility of the cities from the ports, public transport, accessibility of public zones by the elderly, security and cleanliness of public areas, cultural offers and formal short tourism services (i.e. organised tours) that can be offered to same-day visitors. In particular in the Azores, which are a stopover destination for the biannual repositioning of cruise ships between the Mediterranean and the Caribbean, this activity is too concentrated on the main islands and therefore one solution could be to develop short 'micro cruises' with small- to medium-sized motor or sailing boats that last one or two days. Similarly, cruise operators should be encouraged to seek synergies with local tour operators, for instance by extending the length of stopovers so their passengers can participate in complementary attractions and activities. Private initiatives, such as the Association Cruises in the Atlantic Islands that bring together relevant stakeholders, could be important drivers for such projects.

2.3.4 Shipping

The strategic position of Macaronesia in the Atlantic Ocean offers advantages for the development of maritime freight transport, while the fragmentation of the territory makes ferries the most important means of passenger transport (in terms of numbers).

In terms of gaps for the development of the activity, in Madeira and the Azores we identified a lack of staff with the required skills in logistics and management, as well as a low frequency of ferry connections between the islands. Here, the Macaronesian Maritime Cluster could act as a driver for improving training in the area through supporting mutual learning, while ferry companies could take advantage of EU funds (e.g. ERDF) to enlarge their fleet to accommodate more passengers. In the Canary Islands, the situation is almost reversed, as this OR boasts highly trained staff, although generational turnover is needed. In addition, we also identified a lack of financial instruments, as the sector relies heavily on the ERDF.

We also identified important growth drivers in the basin. For instance, the Azores have an infrastructure for the distribution of liquefied natural gas (LNG), a more environmentally-friendly alternative to the fuel oil used by ships. Our recommendation is to expand the local capacities for moving and storing goods, and to upgrade the facilities for bunkering LNG, as LNG-propelled vessels need more frequent refuelling. The Azores could then become the 'transport hub' of the Atlantic. However, private investors are not interested in this area due to restrictive legislation for ports management concessions. Therefore, new port management models should be assessed to attract private investments to upgrade port infrastructures.

In Madeira, key drivers are (i) the investments programme for reorganising harbour infrastructures to avoid conflicts among different maritime activities, and (ii) the enhancement of efficiency and modernisation of ports, intended to be achieved by granting concessions to private investors for the management of ports. However, the developers should ensure that future climatic conditions as well as sea and wave dynamics are taken into account when building these infrastructures. In the Canary Islands, key drivers are the investments made in the ports, such as the construction of a new dock and storage facilities for grain and other food products in the port of Las Palmas, which will provide services to South American exporters. Investments are also made for cruise activities e.g. quay enlargement of Puerto del Rosario.

2.3.5 Marine renewable energy

As in the other sea basins where the territories depend on imported fuel, also in Macaronesia there is a strategic interest in renewable energy. However, the sector is still at a pre-development stage, with only one pilot project of a wave energy plant in the Azores. In the Canary Islands, the regional government is funding the Oceanic Platform of the Canary Islands (PLOCAN), which has the potential to become a world reference as a platform for the development and testing of marine technologies.

In addition to unfavourable climatic conditions in the basin, the main barrier to growth of this sector is represented by the limited potential in the short term for becoming an effective source of energy, which does not attract private investors. To develop blue energies further, we recommend that regional authorities address the R&D challenges and funding issues, and that — in cooperation with private stakeholders and research institutes — they improve related training opportunities.

2.3.6 Blue biotechnology

The activity is not carried out at sea basin level, and has been identified only at OR level. Production of microalgae takes place in the Canary Islands and to a lesser extent in Madeira. This activity, a branch of the aquaculture sector, is considered the basis for future blue biotechnological activity. Also, one company in Madeira is investing in the production of natural extracts from marine macroalgae. More generally, investors are discouraged by high transport costs and by the fact that there are already established players in China and the United States (Hawaii) against which it is difficult and costly to compete. On the other hand, especially in the Canary Islands, the availability of industrial engineers and aquaculture technologists, as well as of desalination facilities, which provide the brine required for the production process, could represent growth drivers.

For this sector, we recommend developing a productive infrastructure for adding value to the existing algae production. Funding, which is currently driven by the Economic Development Company of the Canary Islands (SODECAN), should be diversified.

3 Overall conclusions of the study

The public sector is the 'cornerstone' of blue economy development, not only in terms of financial support, but for developing a holistic vision and for organising the maritime economy in each OR. Of course, decision-making processes cannot be efficient without good knowledge of the sector, which is not a given for these territories. In fact, data gaps are significant even for the tourism sector and for fisheries (stock assessments), as well as for general socio-economic indicators. Therefore, the first step that should be taken is to **set up robust and regular data collection and management systems**, for instance by setting up dedicated 'observatories' for identifying and quantifying the maritime dimension of all ORs and for better defining strategies aimed at developing their blue potential. Moreover, for economic data, the **availability of structural business statistics** at (at least) NACE 4 level **should be ensured** by national statistical institutes and EUROSTAT, to allow an effective monitoring of the blue economy of the ORs.

Other universal gaps are the limited availability of adequately qualified and trained staff and the absence of links between the education systems in the ORs and businesses involved in the blue economy. This not only hinders the creation of training that is 'tailored' to industry needs, but it also reduces the attractiveness of the maritime sector for younger generations, thus limiting generational turnover. Therefore, **a more pro-active role of industry in the education systems should be encouraged** in all ORs. Structural funds are available to support the improvement of professional skills, including for the blue economies of the ORs.

Two needs have been identified in the fisheries sector of all ORs: the identification of new sources of funding for supporting the renewal of the fleets, and the improvement of the activity's attractiveness for younger people to help generational turnover. Considering that EU policies do not cover fleet renewal, local public authorities should launch consultations between the sector and national authorities to identify possible

actions and alternative funds. Regarding the generational turnover, promotional campaigns should be launched by local public authorities to inform youngsters about the opportunities that the sector can offer, while the training of fishermen as 'entrepreneurs' could enable them to diversify into other sectors.

Coastal tourism plays a pivotal role in the blue economy of all ORs, having the largest socio-economic impact and still showing some growth. Its potential could be improved further by local public authorities by developing a holistic vision for the development of the sector and strengthening synergies along the tourism supply chain, with other maritime activities (e.g. pesca-tourism), and with other territories in the same sea basins. Increased flows of tourists will generate not only higher demand for goods, but also for energy. It is essential not only to upgrade shipping and port facilities or to market local seafood to tourists, but also to invest in renewable energy. Realising the potential of coastal tourism depends on the extent to which necessary investments are undertaken by private companies in all ORs.

While coastal tourism could be seen as the 'lead engine' for the development of the blue economy in the ORs, our analysis shows that, while there are certain commonalities, each sea basin and **each OR has its own specificities** that need to be addressed by specific public and private interventions. Table 1 below reports the main measures that we identified in each sea basin for the development of each analysed blue economy activity. More detailed conclusions and recommendations are given in the report.

Finally, it is worth mentioning the key **role of the ORs in the EU's international cooperation framework**. Within the context of the Transatlantic Ocean Research Alliance, the European Commission's agenda for international ocean governance and the European Neighbourhood Policy, the ORs can play a key role since they are representatives of the EU in the world where they can act as its outposts for streamlining new fields of international cooperation. The ORs allow the EU to actively participate in international cooperation frameworks far from its continental borders and can therefore play the role of 'promoters' of EU blue growth policies in external contexts. They can also disseminate best practices in their respective sea basins and share experiences with neighbouring countries. As an example, the Canary Islands' PLOCAN participates in the EU-funded project Atlantic Ocean Research and Collaborative Supporting Action, which is carried out within the framework of the Atlantic Ocean Research Alliance. The aim of this initiative is to support the Commission in negotiations with the USA and Canada on Transatlantic Ocean Research Cooperation. The secretariat of the Atlantic Ocean Research Alliance is able to provide research knowledge and experience through its partners in blue growth activities, such as aquaculture, biotechnology and renewable energies, and to support actions, such as the sharing of access to infrastructure. Thus, it can directly contribute to blue growth in the Canary Islands by channelling the expertise of the partners. It has also positive effects for the other regions due to the strong collaboration networks in the sea basin.

Table 1 – Summary table of main public and private interventions by sea basin

	Caribbean-Amazonia	South West Indian Ocean	Macaronesia
Fisheries and aquaculture	<ul style="list-style-type: none"> • Improve regional cooperation for the management of fishery resources. • Adopt guarantee systems and fiscal mechanisms for supporting investment in aquaculture. 	<ul style="list-style-type: none"> • Re-launch local aquaculture production by recruiting a local hatchery manager. • Align the remaining 'irregular' fishing vessels to EU safety standards. • Develop a longline tuna fishing fleet in Mayotte 	<ul style="list-style-type: none"> • Improve the control of irregular fishing activities. • Assess the sustainability of exploiting new species (deep-water species). • Support the diversification of fishing activities.
Coastal tourism	<ul style="list-style-type: none"> • Improve services in the marinas. • Upgrade hotels to international standards. • Support the development of ecotourism. • Develop synergies between cruise and coastal tourism. 	<ul style="list-style-type: none"> • Support the development of ecotourism. • Raise language skills of staff employed in the sector (English, French, Chinese and Russian). • Create a 'whale sanctuary' to enable whale watching in Réunion. 	<ul style="list-style-type: none"> • Ensure a trade-off between development activities and environmental protection. • Diversify activities in the Azores and Madeira. • Better plan and regulate the maritime space dedicated to tourism.
Cruise tourism	<ul style="list-style-type: none"> • Improve access to city centres and the waterfront. • Develop a regional cruise strategy shared by both private and public stakeholders. 	<ul style="list-style-type: none"> • Adopt an integrated approach for the development of cruise tourism at sea basin level. • Analyse and restructure the local cruise supply chain. 	<ul style="list-style-type: none"> • Reduce seasonality effects and coordination of efforts in the sector for increasing on-land offer to cruisers. • Develop short-haul, micro cruises in the Azores.
Shipping	<ul style="list-style-type: none"> • Improve cooperation between port administrations to reduce competition and increase complementarities. • Stimulate joint investments by port operators and private companies to enhance the ports' efficiency. 	<ul style="list-style-type: none"> • Develop short sea shipping in Mayotte. • Expand port infrastructures for transhipments and develop a free trade zone in Réunion. 	<ul style="list-style-type: none"> • Assess new port management models. • Improve environmental assessments of port infrastructures in Madeira. • Increase the number of connections to support tourist movements. • Develop the Azores as a transport and re-fuelling hub in the Atlantic.
Marine renewable energy	<ul style="list-style-type: none"> • Strengthen cooperation in the region to avoid duplication of research efforts. • Support a feasibility study in French Guiana for hydro-kinetic power. 	<ul style="list-style-type: none"> • Support the development of marine renewable energies in the sea basin. • Promote the development of adequate technologies given local weather conditions. • Support the training of the workforce in Réunion. 	<ul style="list-style-type: none"> • Consolidate cooperation and research in the area. • Supporting the exchange of best practices.
Blue biotechnology	<ul style="list-style-type: none"> • Support research and networking on the development of bio-resources. • Encourage the sharing of experiences between territories. 	<ul style="list-style-type: none"> • Support capacity building in the sea basin. • Launch research initiatives in blue biotechnology. 	<ul style="list-style-type: none"> • Develop the infrastructure required to add value to microalgae production. • Consolidate cooperation among territories in the basin.

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