Satellite Account for the Sea
2010-2013

The sea related activities accounted for 3.1% of GVA and 3.6% of employment in the period 2010-2013

The Satellite Account for the Sea (SAS) identified around 60,000 entities whose activity represented, on average, 3.1% of Gross Value Added (GVA) and 3.6% of employment (full-time equivalent - FTE) of the Portuguese economy in the period 2010-2013. The average compensation of employees in the SAS exceeded about 3% of the national average remuneration.

SAS includes characteristic activities (1.7% of the GVA and 2.0% of the employment), crosscutting activities (0.6% of the GVA 0.7% of the employment) and the activities favoured by the proximity of the sea (0.8% of the GVA and 0.9% of the employment).

In the period 2010-2013 the national economy recorded a significant cumulative reduction with GVA declining by 5.4% and employment by 10.0%. The economic activities considered within SAS presented more favourable performances as the GVA generated by the "sea" increased 2.1%, while the employment decreased 3.4%.

Statistics Portugal presents, in this press release, the results of the Satellite Account for the Sea (SAS), for the period 2010-2013, which are consistent with National Accounts (base 2011). Satellite accounts are intended to increase the capacity of observation of particular phenomena, constituting extensions in greater detail of National Accounts (NA).

Satellite accounts are sometimes developed in partnership with particularly oriented institutions for the study of certain phenomena, thus seeking to complement the statistical methods followed by Statistics Portugal with the specific knowledge available in these institutions.

In the case of SAS, the project was developed by Statistics Portugal in partnership with the Directorate-General for Maritime Policy (DGPM), pursuant to an agreement between the two institutions in 2013.

Given the growing interest that knowledge about the economic significance of the Sea has raised, it is expected that the SAS may become a useful and timely information tool. Obviously, it does not deplete relevant economic information, existing or still to be produced, on the sea, particularly regarding the value of natural resources and the issue of sustainability of economic growth based on their exploitation.

The fundamental methodological references of SAS were the manual of the European System of Accounts (ESA 2010), the proposal of a database for the Integrated Maritime Policy, made for EUROSTAT, in

2009: Ifremer *et al.*, *Study in the field of maritime policy - Approach towards an Integrated Maritime Policy Database* and the studies done and in progress since 2012, by the European Commission / DG MARE, on the *Blue Growth*.

Taking into account these references and the Portuguese reality, the following sea observation levels were defined:

1) Characteristic activities (those where an important part of its operations are on the ocean or which products come or are intended to be used in the sea/ocean or in the coastal boarders);

2) Crosscutting activities (support activities to the other activities assumed for the SAS, corresponding to maritime equipment and maritime services);

3) Activities favoured by the proximity of the sea (coastal tourism).

In addition, 9 groups of activities were determined, following a value chain logic (vd. Methodological Notes). The main uses and resources of the "sea" products are also analysed (see Figure 1).

This press release is organized as follows:

• First, the main key indicators are presented;

• Secondly, a more detailed description of the results by groups is made;

• It follows a brief international comparison with European countries for which studies on the sea/ocean are available;

• Finally, some methodological notes are presented.

Figure 1 – Information scheme of SAS
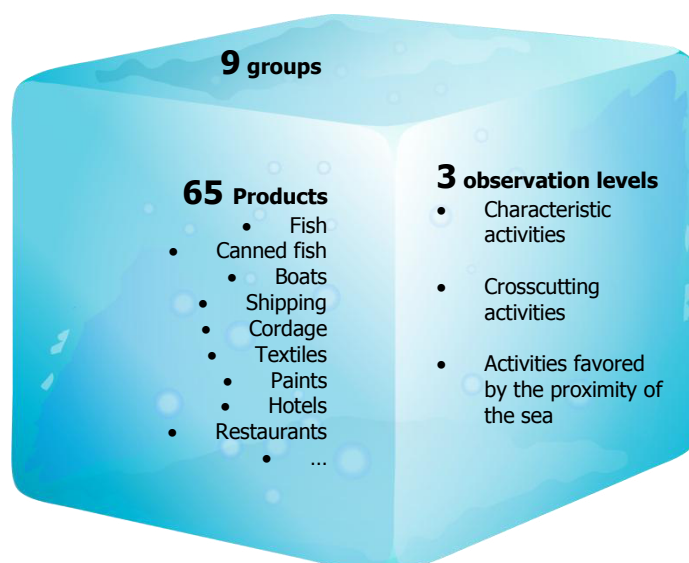
1. Main results

SAS presents a set of key economic variables, namely Gross Value Added (GVA), employment, compensation of employees, final consumption, investment, imports and exports.
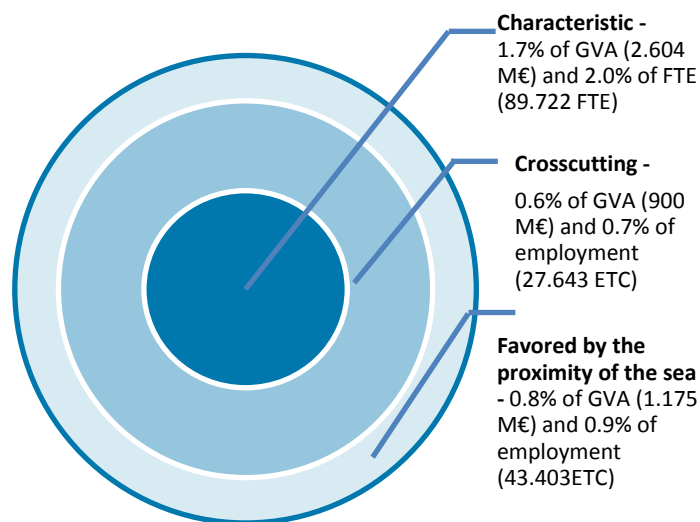
Additional information can be found on Statistics Portugal website, in the area dedicated to National Accounts (Satellite Accounts section).

1.1. Analysis by observation levels

The Portuguese SAS covers both activities that are located in the maritime area, in coastal areas and in remote areas of the coast, if related to the sea. According to this concept, the sea represented, on average, in the period 2010-2013, 3.1% of GVA (4.680 million euros) and 3.6% of employment (160.766 ETC) of the national economy, with the following breakdown:

- Characteristic activities, such as fishing and aquaculture, salt production, shipbuilding, port activities, shipping, maritime works, etc., represented 1.7% of GVA and 2.0% of total employment;

- Crosscutting activities, that is, equipment and maritime services, accounted for 0.6% of GVA and 0.7% of employment;

- The activities favoured by the proximity of the sea, that is, those concerning coastal tourism, accounted for 0.8% of GVA and 0.9% of employment.

Figure 2 - Main indicators of activity according to the observation levels (2010-2013)

Characteristic - 1.7% of GVA (2.604 M€) and 2.0% of FTE (89.722 FTE)

Crosscutting - 0.6% of GVA (900 M€) and 0.7% of employment (27.643 ETC)

Favored by the proximity of the sea - 0.8% of GVA (1.175 M€) and 0.9% of employment (43.403ETC)

1.2. Analysis by groups

StatisticS Portugal and DGPM designed a specific classification (vd. Table 3 in Methodological Notes), in order to adopt a value chain rationale.

The groups that presented higher relative importance regarding the number of units were those belonging to *4 - Recreation, sports, culture and tourism* (73,8% of about 60,000 of kind of activity units considered in the SAS), standing out, in this group, accommodation and food and beverage services (only for touristic purposes, in coastal areas).

This preponderance is also translated into economic relevance, with 35.5% of GVA and 28.6% of employment. It is followed by Group *1 – Fisheries, aquaculture, processing, wholesale and retail of its products*, responsible for 25.7% of GVA and 38.8% of employment. It should be noted that the downstream activities to the main activities of this group, such as

processing industry and wholesale and retail activities have a determinant relative weight in this group.

Table 1 - Main indicators (by group) - average values in 2010-2013

Classification by group	Kind of activity units	Gross value added (GVA)	Employment
	No	10⁶ euros	FTE
1. Fisheries, aquaculture, processing, wholesale and retail of its products	10,296	1,203	62,414
2. Non-living marine resources	83	49	2,333
3. Ports, transports and logistics	1,092	676	15,086
4. Recreation, sports, culture and tourism	43,370	1,660	45,950
5. Shipbuilding, maintenance and repair	373	119	4,404
6. Maritime equipment	495	159	9,028
7. Infrastructures and maritime works	772	65	2,850
8. Maritime services	2,235	741	18,615
9. New uses and resources of the ocean	22	7	88
Total of satellite account for the sea (SAS)	58,738	4,680	160,766
National economy	-	152,425	4,409,186
SAS/ National economy	-	**3.1%**	**3.6%**

The comparison of SAS with other available satellite accounts in Portugal reveals that the "sea" is the most important regarding the relative weight in national GVA. Concerning employment (Full-time equivalent - FTE), the "sea" appears in the second position in terms of relative weight in national paid employment and in third in total employment[1].

Chart 1 – Comparison of SAS with other Portuguese satellite accounts (GVA, FTE and employees FTE)
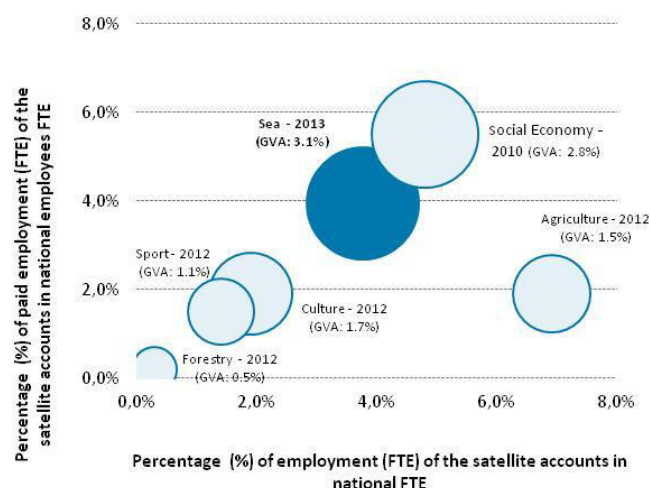
The following chart depicts the relative size of the sea in the GVA of the Portuguese economy in comparison with some of the National Accounts industries. The SAS GVA is higher than telecommunications (1.9%), crop and animal production (1.5%) or manufacture of wood and of cork (0.6%).

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[1] For this comparison it should be noted that there might be intersections among the reference populations of the kind of activity units included, although of a minor economic importance, in general. For instance, the Sports Satellite Account includes kind of activity units dedicated to nautical sports, also included in the Satellite Account for the Sea.

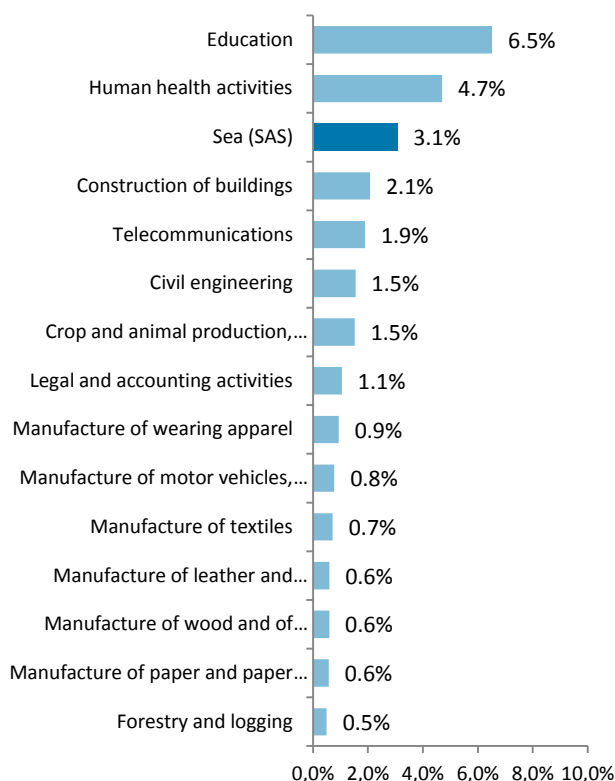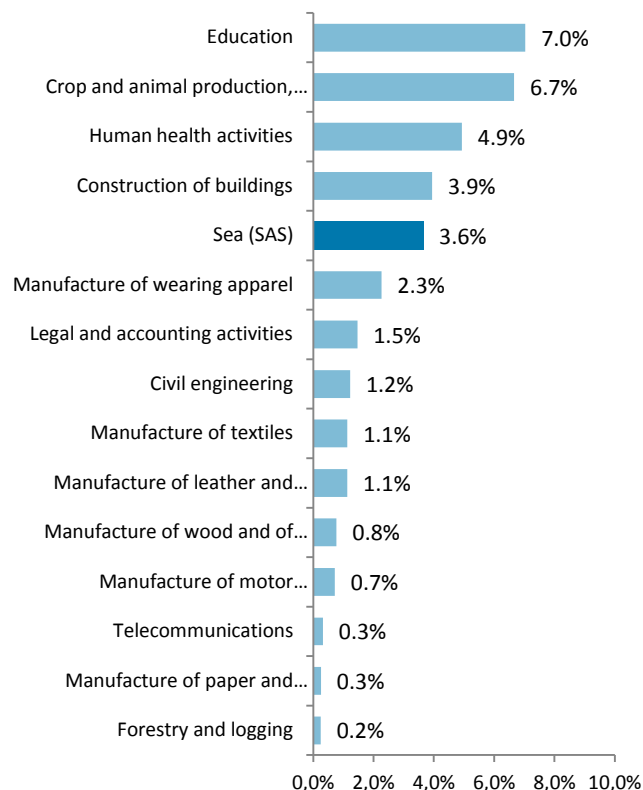**Chart 2 - SAS and some industries GVA weight in the economy in 2010-2013**

Industry	GVA weight
Education	6.5%
Human health activities	4.7%
Sea (SAS)	3.1%
Construction of buildings	2.1%
Telecommunications	1.9%
Civil engineering	1.5%
Crop and animal production,…	1.5%
Legal and accounting activities	1.1%
Manufacture of wearing apparel	0.9%
Manufacture of motor vehicles,…	0.8%
Manufacture of textiles	0.7%
Manufacture of leather and…	0.6%
Manufacture of wood and of…	0.6%
Manufacture of paper and paper…	0.6%
Forestry and logging	0.5%

Chart 3 - SAS and some industries employment weight in the economy in 2010-2013

Industry	Employment weight
Education	7.0%
Crop and animal production,…	6.7%
Human health activities	4.9%
Construction of buildings	3.9%
Sea (SAS)	3.6%
Manufacture of wearing apparel	2.3%
Legal and accounting activities	1.5%
Civil engineering	1.2%
Manufacture of textiles	1.1%
Manufacture of leather and…	1.1%
Manufacture of wood and of…	0.8%
Manufacture of motor…	0.7%
Telecommunications	0.3%
Manufacture of paper and…	0.3%
Forestry and logging	0.2%

The SAS employment is higher than manufacturing of wearing apparel (2.3%) or the manufacture of motor vehicles, trailers and semi-trailers (0.8%).

The period considered corresponds to a general contraction phase of the economic activity in Portugal, with significant declines in gross domestic product (GDP) and employment. However, economic activities related to the sea presented better performances, reflected in the behaviour of the main indicators.

GVA generated by the "sea" increased 2.1% in cumulative terms in the period 2010-2013, mainly due to the impulse of tourism in coastal areas and to the ports activity, while the national GVA decreased 5.4%. The SAS employment decreased 3.4% in the same period, which compares with a considerable decrease of employment in the national economy (-10.0%).

The average wage in SAS was about 3% higher than in the economy during the period.

1.3. Analysis by major uses and resources of "sea" products[2]

Imports of sea products decreased 35.0% in the period 2010-2013 and represented 4.3% of total imports in 2010 and 2.8% in the following years. Note that in 2010 the value of imports was exceptionally high, mainly due to the acquisition of other transport equipment, which includes submarines purchased by the Portuguese Navy. Considering only the period 2011-2013, the imports of sea products decreased only 1.5%.

On the contrary, exports of sea products increased 12.0% in the period 2010-2013, while the total domestic exports grew 25.2%. Thus, exports related to the sea lost relative importance in the national economy (3.3% in 2010 and 2.9% in 2013).

With the exception of 2010, which observed a very negative external balance of sea products (-1,097.0 M€) due to the aforementioned effect on imports, the period 2011-2013 was characterized by a positive external trade of sea products. In 2013 the external balance of sea products reached 116.4 M€, to which contributed significantly the tourism in coastal areas, particularly through accommodation services.

Graph 4 – Evolution of Imports, Exports and External balance of "sea" products

10^6 euros

Considering only the period 2011-2013, the products with higher relevance in the imports' structure were food products (from agro-industries, especially the fresh fish, chilled or frozen, shellfish, dried fish, salted or in brine; smoked fish, and also for canned and other fish preparations) with 62.7%, and fishery and aquaculture products with 15.0% on average in the period 2010-2013.

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[2] Vd. list of sea products in the annex tables to this press release, on Statistics Portugal website.

**Graph 5 - Structure of sea imports in 2011-2013**
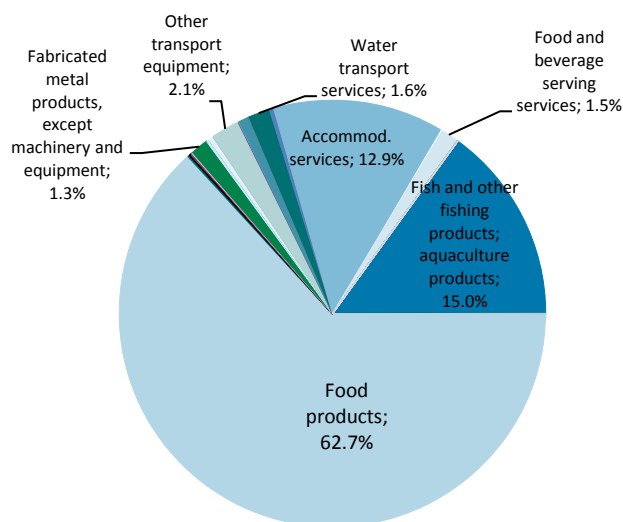
In sea exports, there is a less pronounced prevalence of food products (32.0%), and fishery and aquaculture products (9.4%). It should be highlighted the relative weight of accommodation services (24.7% of average of exports in the period) followed by water transport services (12.4%).

Graph 6 - Structure of sea exports in 2010-2013
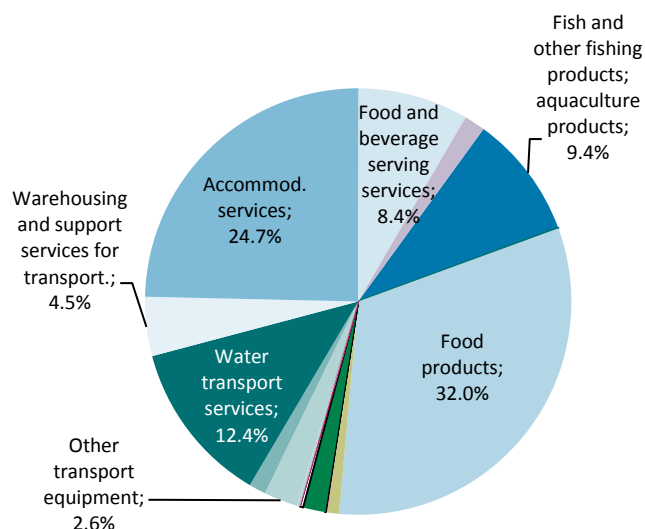
Contrary to what was observed in the economy, household's final consumption of sea products (private consumption) recorded an increase in the period (+7.3% between 2010 and 2013). Consequently, the relative weight increased from 5.4% to 6.2%. During this period, households' expenditure on sea products focused mainly in food products (25.6%) and fisheries and aquaculture products (21.2%). For the nominal increased of households' final consumption expenditure of sea products it was crucial the increase in canned and other fish preparations, which grew by about 40% between 2010 and 2013, although fresh fish, chilled or frozen and dried fish, salted or in brine have also slightly increased over the same period.

Figure 7 – Households final consumption expenditure structure in the period 2010 2013
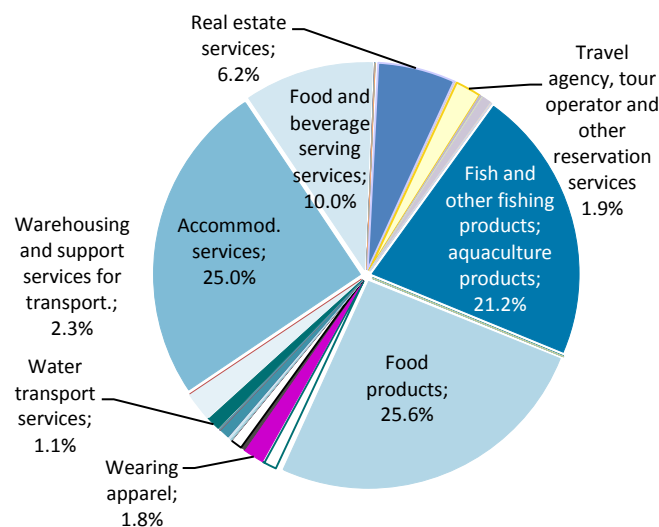

The general government consumption expenditure (public consumption) in sea products decreased in the period (-14.1% between 2010 and 2013), a decrease slightly more pronounced than in the national economy (-12.8%, in the same period). The relative importance remained around 2.5%.

From 2010 to 2013, the public consumption of sea products focused mainly (82.5%) on the public administration and defence services.

Graph 8 – General government final consumption expenditure structure in the period 2011-2013
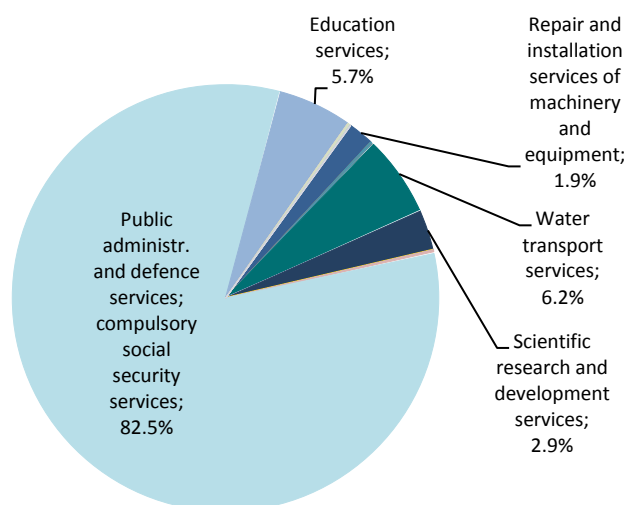
Gross Fixed Capital Formation (GFCF) decreased significantly in the period (-74.3%). However, not considering the year 2010 (exceptionally high, due to the acquisition of submarines), between 2011 and 2013 GFCF of sea products decreased by 9.5% comparing with a 22.6% GFCF decline in the national economy.

The relative importance of sea GFCF reflected these developments, dropping from 4.3% of national GFCF in 2010, to 1.4% in 2011 and 1.6% in 2013.

Considering only the period 2011-2013, the products with higher relative importance were buildings and construction and civil engineering works, with 38.7%, and scientific and research and development services, with 21.9%.

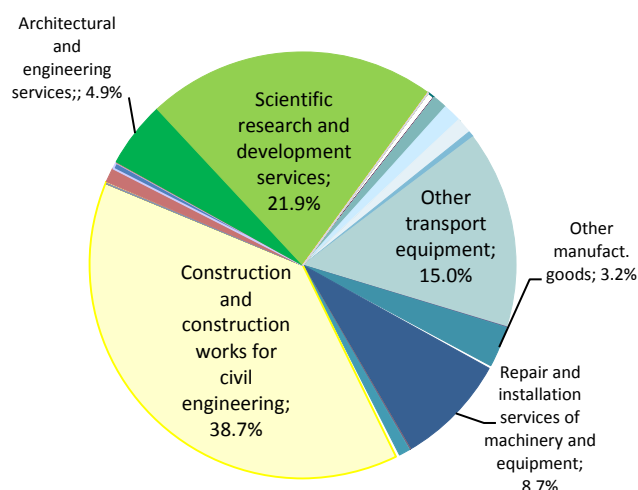**Graph 9 - GFCF sea products in the period 2011-2013**

Table 2 - Main results of the Satellite Account for the Sea (SAS), with reference to the total economy of National Accounts (NA), in 2010-2013

	Unit	Levels	2010	2011	2012	2013	Change rate. (%) 2011	2012	2013	SSA/NA (%) 2010	2011	2012	2013	2010-2013
GVA	10^6 euros	SAS	4,615.8	4,698.9	4,688.8	4,714.7	1.8	-0.2	0.6	2.9%	3.0%	3.2%	3.1%	3.1%
		CN	158,325.9	154,242.8	147,361.6	149,768.4	-2.6	-4.5	1.6					
Employment (FTE)	No	SAS	162,901	161,694	161,184	157,286	-0.7	-0.3	-2.4	3.5%	3.6%	3.8%	3.8%	3.6%
		CN	4,644,624	4,527,650	4,285,672	4,178,797	-2.5	-5.3	-2.5					
GVA/FTE	10^3 euros	SAS	28.3	29.1	29.1	30.0	2.8	0.0	3.1	83.0%	85.3%	84.6%	83.8%	84.2%
		CN	34.1	34.1	34.4	35.8	0.0	0.9	4.1					
Compensation of employees	10^6 euros	SAS	3,147.9	3,119.1	3,103.7	3,110.1	-0.9	-0.5	0.2	3.7%	3.8%	4.1%	4.1%	3.9%
		CN	84,841.6	81,617.3	75,304.7	76,279.9	-3.8	-7.7	1.3					
Employees (FTE)	No	SAS	146,184	144,766	144,164	141,008	-1.0	-0.4	-2.2	3.7%	3.7%	3.9%	3.9%	3.8%
		CN	3,976,360	3,871,271	3,657,067	3,582,077	-2.6	-5.5	-2.1					
Average compensation of employees	10^3 euros	SAS	21.5	21.5	21.5	22.1	0.0	0.0	2.8	100.9%	101.9%	104.4%	103.8%	102.7%
		CN	21.3	21.1	20.6	21.3	-0.9	-2.4	3.4					
Compensation of employees/GVA	%	SAS	68.2	66.4	66.2	66.0	-2.7	-0.3	-0.3	127.3%	125.4%	129.5%	129.5%	127.9%
		CN	53.6	52.9	51.1	50.9	-1.3	-3.4	-0.3					
Private comsumption (families)	10^6 euros	SAS	6,265.0	6,393.7	6,697.6	6,723.2	2.1	4.8	0.4	5.4%	5.7%	6.2%	6.2%	5.9%
		CN	115,063.3	112,610.6	108,221.2	107,717.3	-2.1	-3.9	-0.5					
Public comsumption	10^6 euros	SAS	932.9	872.7	762.8	801.6	-6.5	-12.6	5.1	2.5%	2.5%	2.4%	2.5%	2.5%
		CN	37,270.0	34,983.4	31,176.8	32,500.6	-6.1	-10.9	4.2					
GFCF (products)	10^6 euros	SAS	1,586.9	450.6	513.2	407.6	-71.6	13.9	-20.6	4.3%	1.4%	1.9%	1.6%	2.3%
		CN	36,937.7	32,451.8	26,672.0	25,122.0	-12.1	-17.8	-5.8					
Exports	10^6 euros	SAS	1,767.2	1,936.9	1,837.6	1,978.5	9.6	-5.1	7.7	3.3%	3.2%	2.9%	2.9%	3.1%
		CN	53,750.9	60,409.9	63,503.8	67,283.9	12.4	5.1	6.0					
Imports	10^6 euros	SAS	2,864.2	1,890.1	1,830.3	1,862.1	-34.0	-3.2	1.7	4.3%	2.8%	2.8%	2.8%	3.2%
		CN	67,350.6	67,951.9	64,359.0	65,572.7	0.9	-5.3	1.9					
External balance	10^6 euros	SAS	-1,097.0	46.8	7.3	116.4	0.0	0.0	0.0	8.1%	-0.6%	-0.9%	6.8%	3.3%
		CN	-13,599.7	-7,542.1	-855.2	1,711.2	0.0	0.0	0.0					

Memo items:

|	Unit	Levels		2010	2011	2012	2013	2011	2012	2013
GDP				179,929.8	176,166.6	168,398.0	170,269.3	-2.1	-4.4	1.1
Domestic demand	10^6 euros	CN		193,529.5	183,708.6	169,253.1	168,558.1	-5.1	-7.9	-0.4
Private consumption of durable goods				11,164.5	9,311.6	7,107.7	7,135.6	-16.6	-23.7	0.4

2. Summary characterization of the SAS in Portugal

2.1. By groups

2.1.1. Units

Group 4 - *Recreation, sports, culture and tourism*, presented the higher number of units, 73.8% of around 60,000 selected units. Group 1 - *Fisheries, aquaculture, processing, wholesale and retail of its products* appears in the second place, with 17.5%.

**Chart 10 - Economic activity units at SAS (by group) in 2010-2013**
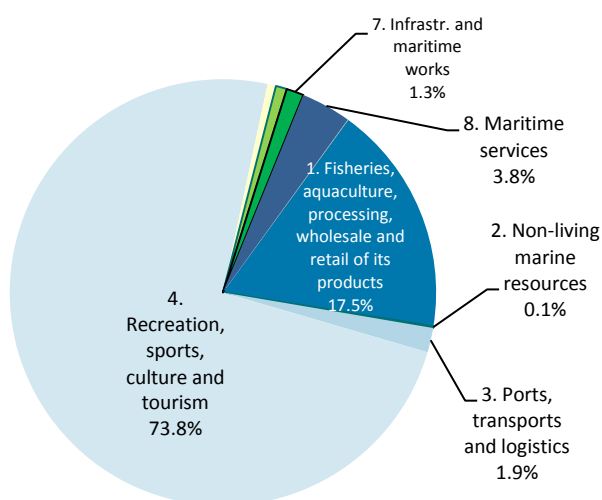
2.1.2. GVA

Analysing the GVA of SAS by group in the period 2010-2013, it can be observed that group 4-*Recreation, sports, culture and tourism*, accounted for 35.5%, followed by group 1- *Fisheries, aquaculture, processing, wholesale and retail of its products*, with 25.7%, group

8 - *Maritime services*, with 15.3% and group 3 - *Ports, transports and logistics,* with 14.5%.

**Graph 11 - GVA structure at SAS (by group), in 2010-2013**
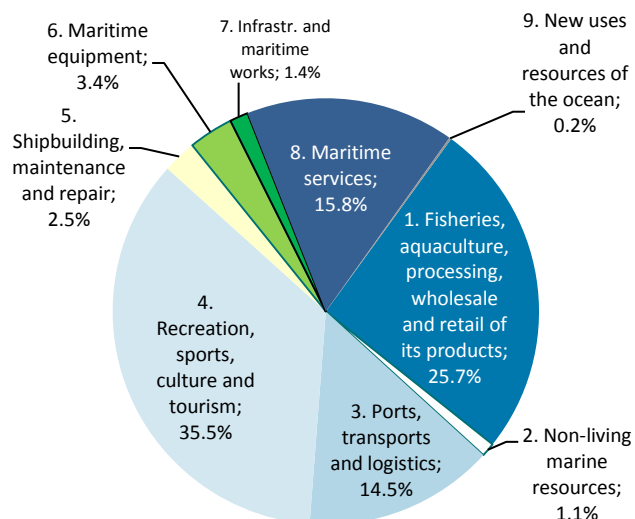
From 2010 to 2013, the SAS GVA increased 2.1%. Looking in more detail, it can be observed that this development was not widespread and was mainly determined by the growth in groups 1 - *Fisheries, aquaculture, processing, wholesale and retail of its products,* 3 - *Ports, transports and logistics,* and 4 - *Recreation, sports, culture and tourism* (+4.0%, +30.0% and + 5.4% respectively).

Graph 12 - Evolution of GVA in SAS (by group) in 2010-2013
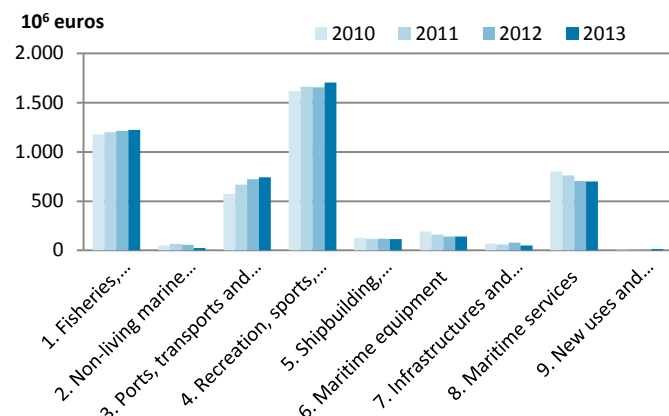
Graph 13 - Structure of Employment in the SAS (by group) in 2010-2013
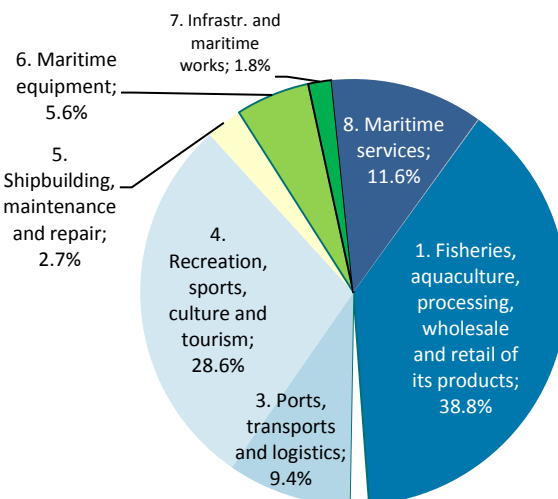

2.1.3. Employment

In terms of employment (full-time equivalent - FTE) there is a distinct order compared to the one observed in GVA. In fact, in the period 2010-2013, 38.8% of SAS employment (FTE) was concentrated in group 1 - *Fisheries, aquaculture, processing, wholesale and retail of its products*, followed by group 4 - Recreation, sports, culture and tourism (28.6%), group 8 – *Maritime services* (11.6%), and group 3 - *Ports, transports and logistics (9.4%)* inverting the relative positioning of the first two groups in comparison to the distribution observed in GVA.
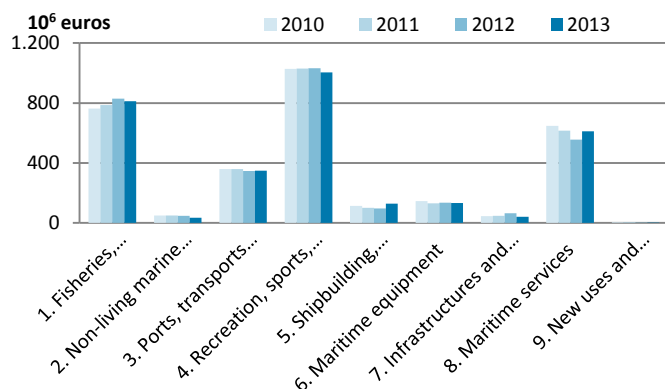
2.1.4. Compensation of employees

Groups 4 – *Recreation, sports, culture and tourism* and 1 - *Fisheries, aquaculture, processing, wholesale and retail of its products* were the most relevant in terms of compensation of employees, with 35.5% and 25.7%, respectively.

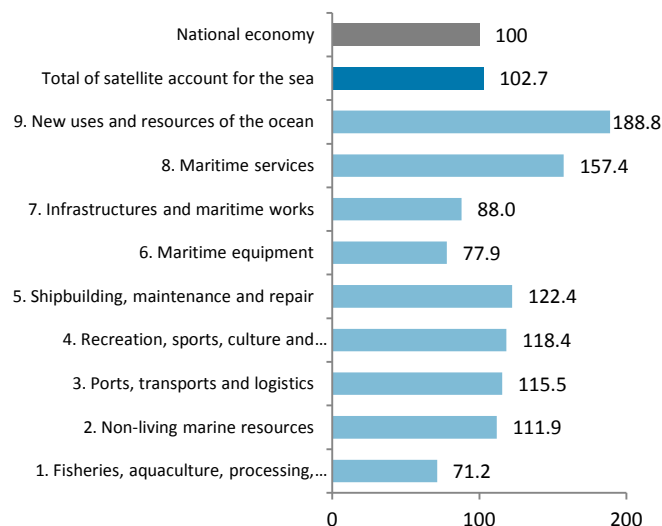**Graph 14 – Compensation of employees in SAS (by group) in 2010-2013**
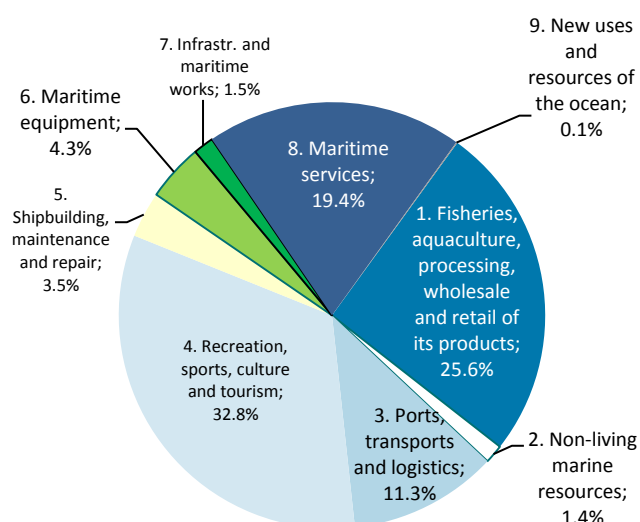
Between 2010 and 2013 the compensation of employees decreased by 1.2%, having registered an almost general decrease in all groups, except groups 1 - *Fisheries, aquaculture, processing, wholesale and retail of its products* and 5 - *Shipbuilding, maintenance and repair*. It should be highlighted, by the relative importance, the decline recorded in group *8 – Maritime services* (-5.4%).

Graph 15 - Evolution of compensation of employees in SAS (by group), in 2010-2013

10^6 euros

The average compensation of employees presented a significant dispersion in the groups, with group 9 - *New uses and resources of the ocean* and 8 – *Maritime services* registering the highest average value (+84.8% and +57.3% than the national average respectively). At the other end are groups 2 – *Non-living marine resources* and 6 - *Marine equipment* with average compensation of employees bellow national average. This dispersion largely reflects the heterogeneity of human resources skills among the different groups.

Graph 16 – Average compensation of employees in the SAS (by group) in 2010-2013

Category	Value
National economy	100
Total of satellite account for the sea	102.7
9. New uses and resources of the ocean	188.8
8. Maritime services	157.4
7. Infrastructures and maritime works	88.0
6. Maritime equipment	77.9
5. Shipbuilding, maintenance and repair	122.4
4. Recreation, sports, culture and…	118.4
3. Ports, transports and logistics	115.5
2. Non-living marine resources	111.9
1. Fisheries, aquaculture, processing,…	71.2

3. International comparisons

So far Portugal is the only European country with SAS. There are, however, some estimates on the value of the economy of the sea at global and regional level, as well as numerous studies conducted by countries, to try to quantify the relative importance of the ocean in the economy (in terms of GVA / GDP and employment).

For international comparisons it were used reference values for some European countries included in the publication from OECD, 2016: *The ocean economy in 2030.*

However, these comparisons should be made wuth cautious, because there is no time coincidence of

several works, no full harmonization in the activities, products and methodologies considered[3].

In any case, in a qualitative perspective, the results presented by the OECD for four European countries put Portugal in the middle of the ranking, near the Netherlands and above France.

Graph 17 – Weight of sea GVA / GDP in national economy in some European countries
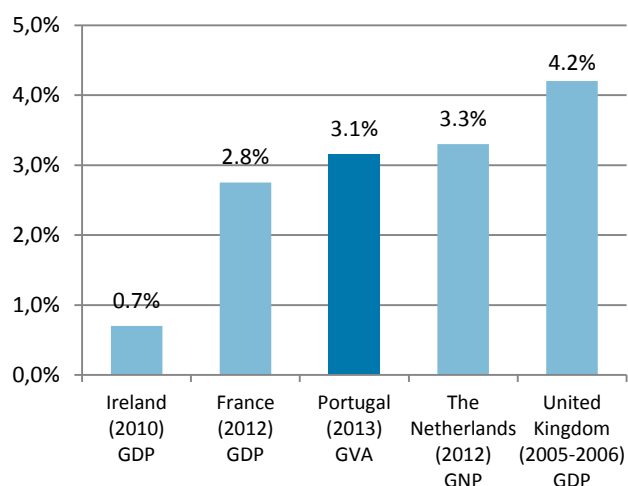
As far as employment is concerned, compared to other European countries and estimates to the European average, Portugal appears first in the ranking, which can be explained by the preponderance of fish and tourism value chains, with more labour-intensive industries.

Graph 18 – Weight of sea Employment (FTE) in the national economy in some European countries

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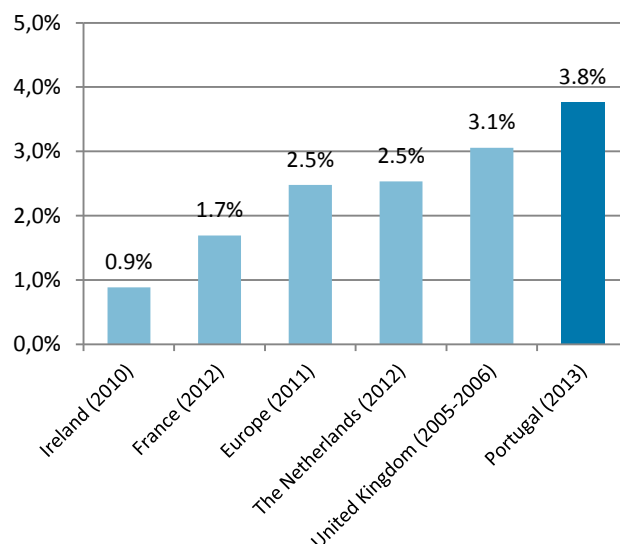
[3] There are studies that consider indirect effects, such as Iceland, or clusters, such as Belgium, which, therefore, were not included in the comparative analysis of this press release.

Methodological notes:

Introduction

The Satellite Account for the Sea (SAS) is based on the conceptual framework of the Portuguese National Accounts (PNA) System. The project aims to provide statistics that measure the size and importance of the Ocean Economy in the Portuguese economy, and to support the decision on coordination of public policies for the sea, providing information on the production structure of the related activities, the explanation of the services that it involves and the characterization of the agents who provide them, contributing to monitor the national strategy for the sea for 2013-2020 (ENM 2013-2020), from the economic point of view.

SAS allows having adequate information in the context of the Integrated Maritime Policy (IMP) and other processes where it is important to have statistical information. Note that, at European level, the document "Blue growth" is the socio-economic dimension of the IMP, thereby contributing to the Europe 2020 Strategy and to the Maritime Strategy of the European Union for the Atlantic Area.

The main objective of the SAS is to provide an economic information system related to the sea, designed as a satellite of National Accounts (NA). The choice of NA as reference reflects its importance as a complete representation, reliable, systematic and internationally comparable of the functioning of the economy.

SAS was considered the most appropriate tool to estimate the size and importance of the sea in the Portuguese economy and to obtain information on the structure of the production activities related to the sea.

SAS privileged the simultaneous treatment of supply and demand. Thus, information was obtained, not only for the production account (output at basic prices, intermediate consumption, GVA), but also for relevant economic variables such as household and public administrations consumption, imports and exports. Thus, it was possible to estimate the "Sea" contribute to GVA and national employment. Additionally, an estimate was made for paid and unpaid employment, not only due to its relevance, but also to allow assessing the results plausibility.

**1. Methodological references**

The NA satellite accounts have as main reference the NA concepts and methods, as defined in the European System of National and Regional Accounts (ESA 2010). Satellite accounts aim to expand the observation capacity of particular phenomena, constituting extensions in greater detail of the NA.

SAS also has as main methodological references the proposal for a database to IMP, made to EUROSTAT, in 2009: Ifremer et al., "*Study in the field of maritime policy - Approach towards an Integrated Maritime Policy Database*" and the work done and in progress, since 2012, in the EC / DG MARE, in the Blue Growth scope: "*Blue Growth*".

2. Concepts and nomenclatures

In the feasibility study, based on the strategic framework of the EU IMP and of the ENM 2013-2020, it was considered the following conceptual definition of Ocean Economy: "Economic activities that take place at sea and others that are not taking place at sea but depend on it, including marine natural capital and non tradable services of marine ecosystems ", which are not, however, recorded in the SAS as those are not included in the production boundary is NA as defined in ESA 2010 (Figure 4).

Figure 4 - The Ocean Economy for the Satellite Account
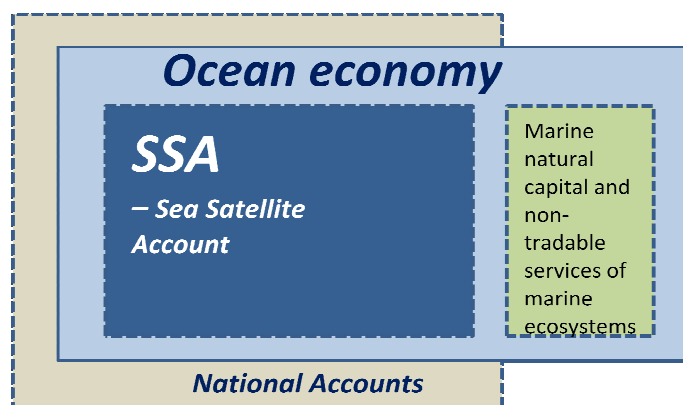
The economic activities that take place at sea are, for example, maritime transport, fisheries and marine aquaculture, bioprospecting, research and exploration of non-living marine resources, marine tourism, marine equipment operation - namely Technologies communication and information Electronics (ICTE) maritime and submarine equipment - and services, such as marine information and communication services.

Among the economic activities that depend on the sea, but do not take place at sea, the following groups are distinguished:
- The activities that directly depend on the enjoyment of goods and services of marine ecosystems (e.g. coastal tourism);
- The activities that provide goods and / or provide specific services to the activities that take place at sea (e.g. ports and logistics, construction, maintenance and ship repair, ship dismantling, construction and marine equipment maintenance and maritime services on land);
- The activities belonging to certain functional chain values, which can hardly be separated, and that influence, directly, the activities that take place at sea. In this situation are the value chain centered on fish (e.g. aquaculture in inland waters, as it uses the same fish distribution channels), the shipping value chain focused on water vessel (e.g. transport on inland waterways, river cruises, where there is no differentiation in the production of vessels), and nautical tourism value chain (covering namely the maritime tourism companies operating in water).

The remaining activities, which do not operate or not depend on the sea, represent the rest of the economy.

The definition of Sea Economy takes into account the economic activities that use the sea, directly or indirectly, focusing on the value chain in which they operate, covering both activities that are located in the maritime area, as others located in coastal areas and also in remote areas of the coast, if related to the "Sea". In this context, the economic value of production and consumption of "maritime" goods and services will depend on the set of productive activities defined in the scope of this study, as activities related directly or indirectly to the sea. Activities that cannot be "measured" under the Portuguese System of National Accounts aggregates were not considered in the SAS context.

The activities or goods and services (products) related to the Sea Economy are fundamentally identified as those who meet simultaneously the following conditions:
1. Activities and / or goods and services that, in the absence of the sea, would cease to exist in significant quantities, or their consumption would be significantly reduced;
2. Existence of statistical information available, or which can be obtained.

It should be noted that the SAS construction is made under the PNA, where the main concepts involved in building a satellite account have its origin, in general, in the European System of Accounts (ESA). Thus, the sea economy does not integrate the non-tradable services of marine ecosystems as these are not included in the production boundary defined by ESA 2010. It is, therefore, more restricted than the one developed within the ENM 2013-2020.

The compilation of SAS started with the transposition of the maritime economy definition for statistical language, specifically the identification of activities and sea products in the official classifications in use. The delimitation and characterization of the reference population of the SAS, inventorying the kind of activity units (KAU) and proceeding to their classification, was conducted by Economic activity (Portuguese Classification of Economic Activities - CAE) and by groups of activities, according to a specific classification designed by Statistics Portugal and DGPM, supported by the ENM 2013-2020 and the IMP.

The scope of the Sea Economy, considered in the SAS, aggregates activities in two main areas: "Established Activities" and "emerging activities" which, in turn, are divided into groups. It were considered nine groups, eight of which correspond to established activities (groups 1 to 8) and the last group 9-New uses and resources of the ocean, which congregates emerging activities (Figure 5). The adopted criterion for the classification of economic activities as established or emerging obeyed the international logic of maturity level of the markets, namely what was followed in the EU, in the study "Blue Growth" for the purpose of international comparisons.

Figure 5 - Groups considered in SAS
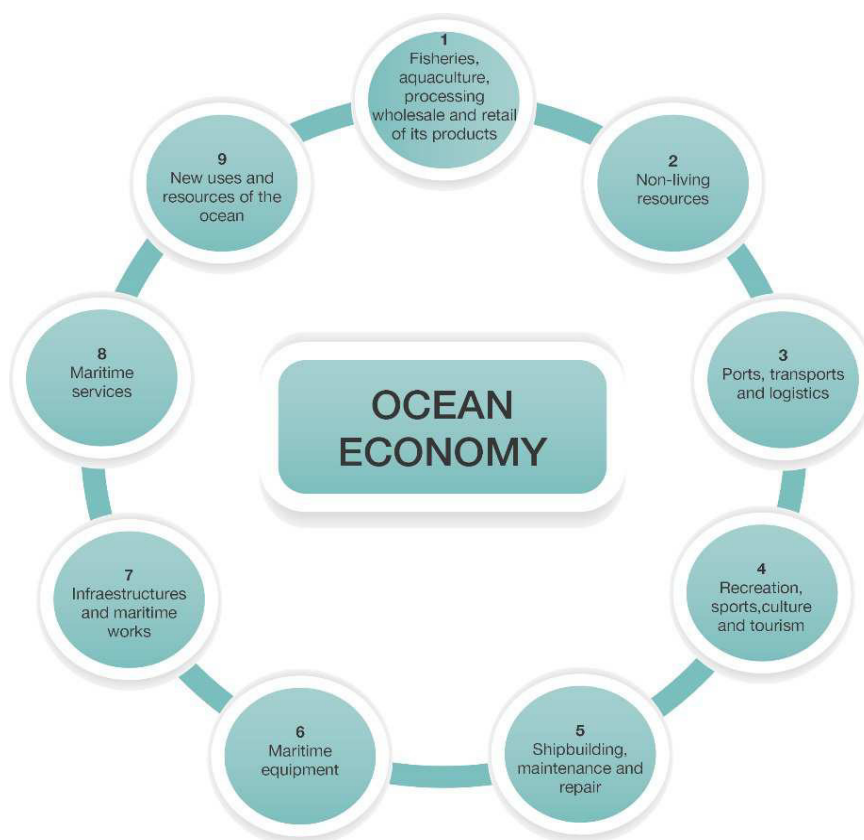
It was adopted a value chain logic, taking into account, inter alia, the level of industry disaggregation permitted by the National Statistical System (NSS). Given this restriction, the methodological option was to consider Maritime and Marine Equipment Services as independent groups, containing cross economic activities to other groups (Table 3).

Table 3 - Groups of economic activities for the Ocean Economy in SAS

Groups	Activities	
	That operate on the Ocean	**That do not operate at the ocean but depend on it***
ESTABLISHED ACTIVITIES		
1. Fisheries, aquaculture, processing, wholesale and retail of its products	Sea fishing	Inland fishing
	Marine aquaculture	Inland aquaculture
	Aquaculture in inland waters	
	Processing industry	
	Processing of fishery and aquaculture products	
		Marketing of fishery and aquaculture products
2. Non-living marine resources	Research marine mineral resources	Sea salt extraction and refining
	Research of conventional energy resources (oil and gas)	
	Exploitation of marine mineral resources	
	Operation of conventional energy resources	
	Capture and water desalination	
3. Ports, transports and logistics	Maritime freight transport	Inland freight transport
	Transport of passengers by ferry	
	Cruises	
	Ports and logistics	
4. Recreation, sports, culture and tourism	Boating (recreational and sport)	
	Cultural activities (eg heritage, shows, events related to the sea)	
		Coastal tourism (ex .: sun / beach)
		Imputed rents (second homes)
5. Shipbuilding, maintenance and repair	Shipbuilding	
	Naval maintenance and repair	
		Naval dismantling
6. Maritime equipment**		Machinery and marine equipment
	Submarine cables and pipelines	
	Ocean Information Technology, Communication and Electronics (ICTE)	
	Maritime robotics	
	Other equipment (e.g. textiles, clothing, packaging, etc.)	
7. Infrastructures and maritime works	Coastal defense works	
	Port infrastructure	
8. Maritime services**	Education and R & D	
	Governance	
	Maritime information and communication services	
		Consulting and services to companies in the areas of the sea
		Financing and marine insurance
	Other services	
EMERGING ACTIVITIES		
9. New uses and resources of the ocean	Marine biotechnology	
	Unconventional energy resources (gas hydrates)	
	Marine renewables	
	Gas storage	
	Earth observation services	

Note:* Or other aquatic environment; ** Encompass transversal uses and activities to other groups.

Legend: Areas of Intervention

- Living resources
- Non-living resources
- Infrastructure, uses and industrial activities
- Infrastructure, uses and services activities
- Governance activities

Groups:

1 - **Fisheries and aquaculture, processing and wholesale and retail of its products** - includes activities related to the value chain of fishery and aquaculture products. The core activities include Fisheries and Aquaculture, with connections upstream to the food industries for animals, such as aquaculture, and downstream with the transformation industry, such as processing and preserving of fish, crustaceans and mollusks. It also includes the production of ice, cold storage and trade, wholesale and retail trade, of fishery and aquaculture products.

2 - **Non-living marine resources** - includes activities related to research and exploitation of conventional energy resources (oil and gas), with the research and exploitation of marine minerals and with the extraction and refining of salt and production of condiments derived from it. It also includes the desalination of sea water.

3 - **Ports, transports and logistics** - includes activities related to the water transportation value chain, whose main activity is the shipping of goods and passengers. Downstream includes port services and rental of maritime and inland waterway transports and the river transport of goods and passengers.

4 - **Recreation, sports, culture and tourism** - includes the maritime activity of recreation and sport, the maritime dimension of culture and maritime and coastal tourism, including maritime touristic activities operating in water. This group includes the activities related to boating, which are considered recreational boating and nautical sports. Coastal tourism includes housing, imputed rents of second homes, real state promotion of tourist accommodation, restaurants, travel agencies and associated recreational activities and leisure, including the related cultural activities, like the activities considered in the Tourism Satellite Account (but only the ones taking place in coastal areas).

5 - **Shipbuilding, maintenance and repair** - comprises construction activities of ships and floating platforms, including pleasure and sport boats, as well as the repair and maintenance activities of boats and its dismantling at the end of life.

6 - **Maritime equipment** - comprises diverse manufacturing activities such as, for example, the ones allowing equipping a vessel or a floating platform. It is a heterogeneous group, dedicated primarily to building and repair of relevant equipment for the other activities of the sea economy. It was decided, therefore, to bring together in one group all the activities identified in the manufacturing industry with the production / repair of marine equipment of support for most of the activities of the other groups.

7 - **Infrastructure and maritime works** - includes activities related to construction works and expansion of port terminals in order to develop maritime and land accessibility conditions, namely land corridors for the transport of goods by rail (associated with shipping, by connecting the rail to the main interchanges of intermodal transport). It also includes the construction and repair of ports, marinas, as well as dredging, protection and coastal defense, etc.

8 - **Maritime services** - includes, as the name indicates, the service activities related to the sea. Includes education, training and R&D in areas related to the sea, governance activities, such as defense and maritime security and maritime spatial planning, and a large subgroup of other service activities encompassing maritime information and communication services, consulting and business services in the areas of the sea, maritime finance and insurance, trade and distribution activities related to the sea and others.

9 - **New uses and resources of the ocean** - this group was established in order to quantify a set of emerging activities, yet with little economic importance, which would, otherwise, be "diluted" in other activities. The relevance of this isolated group was evaluated during the work. Includes the marine biotechnology; marine renewable energies; gases storage; research and exploitation of unconventional energy resources (gas hydrates) and the services of earth observation.

In addition, the SAS information was segmented into observation levels:

- **Characteristics activities** - activities in which an important part of the operations takes place at sea or whose products come from or are intended for use at sea or on the shore limit. This level includes all groups except 6-*Maritime equipment*, 8-*Maritime services* and part of 4-*Recreation, sports, culture and tourism* (notably coastal tourism);

- **Transversal activities** - activities of support to the remaining activities considered under the SAS scope. Include 6- *Maritime equipment* and 8-*Maritime services*;

- **Activities favored by the proximity of the sea** - include the accommodation activities, restaurants and imputed rents of second homes located in villages in coastal areas (based on the European classification of coastal and non-coastal areas, i.e. parishes with maritime coast or with 50% or more of the surface up to 10 km away from the sea (see 3. Methodology, for further detail). This set of activities corresponds to coastal tourism.

3. Methodology

For the **selection of the SAS reference population of units** for the years 2010-2012 was used as starting point the population of the Portuguese NA (Base 2011). Like the NA, the compilation of the SAS population was made by institutional sector (i.e. S.11 - Non-financial corporations, S.12 - financial corporations, S.13 - general government, S.14 - Households; S .15 - Non-profit institutions serving households). Initially, the considered codes were the Portuguese Classification of Economic Activities (CAE Rev.3) related to the NACE codes set out in Ifremer study for Eurostat, previously referenced. However, the building up of the SAS population based only on CAE did not always prove sufficient. Therefore, whenever it was concluded that a certain KAU operations were relevant in the sea area, this KAU was included, regardless of the CAE code.

After the delimitation of the reference population, the collection of economic variables to the generation of income account (production, intermediate consumption, GVA, other taxes on production, other subsidies on production, gross operating surplus), by institutional sector was conducted. Afterwards, a **simplified supply and uses tables (SUT) for "sea" products** was compiled, having as reference the SUT of Portuguese NA (127 branches of economic activity X 433 products), which allowed to confront the supply and demand and assess the initial estimates. For the completion of this framework it was necessary to calculate, by selected product, imports, exports, government consumption, private consumption, investment and intermediate consumption of the product. Whenever the detail of data sources allowed (namely Simplified Business Information - SBI and general government administrative data), these values were obtained directly, without the use of coefficients.

Estimates for 2013 were also made, albeit without the analysis of the entire reference population, using a detailed study of the most relevant entities, of information relating to external trade and detailed information of the definitive NA.

Regarding **education**, an estimate was made for services related to teaching of subjects / courses linked to "sea". This estimate was based on a pre-selection of courses unequivocally related to "sea", based on information provided by the Directorate General Education and Science Statistics (course/entity).

For **Research and Development (R&D)**, a comprehensive research work of R&D projects on "sea", having as the main sources the Survey on National Scientific and Technological Potential (IPCTN), the SBI and the database of the R&D funding from the Foundation for Science and Technology (FCT). The FCT provided annual information of investment and funding, allowing to calculate the expenditure on R&D "sea" projects of units whose activity is wholly or partly related to the sea. The methodology used was the same used by Portuguese NA to calculate the national R&D.

For the **estimates on foreign trade,** having has framework the NA external trade, the Statistics Portugal Foreign Trade database, the SBI and the Balance of External Payments of Portugal from the Bank of Portugal were considered as main sources of information.

In a first phase, NA data were used for the products considered totally "sea". For the other cases, in order to determine the fraction "sea" of External Trade, the classification of international trade statistics was studied in detail. Whenever the classification allowed to determine the share (or fraction) related to the sea, information of the respective flows to economic activity units that made up the SAS universe was appropriated (for example, the detail of the Combined Nomenclature for fishing nets allowed the appropriation of information on imports and exports of ropes and nets). Whenever the detail of nomenclature was not enough to determine what fraction would be "sea", the economic activity units of the SAS universe were studied, identifying the cases that would be more relevant and / or that would be specifically related to the sea, considering only the trade flows of these units (e.g. in the case of "other electrical equipment", only imports and exports of units specifically related to the sea were identified).

In the context of foreign trade, the final consumption expenditure of residents outside the national economic territory associated with hotels, restaurants and similar services and travel agency services, tour operators and other reserves and related services, were also considered as imports, based on the Households Budget Survey (HBS) structures and on the production structures of these products, calculated in the SAS compilation. Similarly, it were considered as exports the final consumption expenditure of non-residents in national economic territory associated with the hotel establishments services, restaurant and similar services and travel agency services, tour operators and other reservation and related services. It was adopted the same line of methodological operation that has been applied to imports of these products. Consequently, household's consumption expenditures of these products are compliant with the residence principle.

When it was not possible to determine which part (or fraction) of foreign trade related to the sea for the KAU from SAS universe, the information was not incorporated.

The estimate of **employment** in the SAS consisted of the calculation of the Full Time Equivalent posts (FTE) for the economic activities considered and by type of entity. For this calculation, the ratios of production and *per capita* earnings, by industry and institutional sector of the NA, at the most detailed level possible, were used. The SAS information for output and compensation of employees, available by industry, institutional sector, CAE Rev.3 section and entity type, was converted to FTE by those ratios.

Box - Tourism and coastal areas

In compiling the SAS for Portugal it were included coastal tourism activities. The compilation of data on tourism within the SAS, which includes hotels and similar establishments, restaurants and similar establishments, travel agencies, tour operators and other reservation services and related activities, was particularly complex.

Under the SAS, and according to *Turismo de Portugal*, IP, in sea-related tourism analysis were considered two aspects:

• consumption stemming from the motivations of consumers;

• Territory (geographic location of consumers of tourism products), taking into account the definition of coastal area.

As far as the motivation of consumers is regarded, in the context of SAS, different types were registered, namely:

• cruises;

• nautical (recreational / sports);

• Sun and sea;

• sporting event (who participate) and for sports-event (onlooker who goes to watch the event);

• health tourism (e.g. .: thalassotherapy);

• scientific tourism / research;

• "nature tourism" (e.g.: observation of cetaceans).

The selection of related kind of economic activity units, including hotels and restaurants resulted, in a first phase, from the intersection with the geographical classification (i.e., check if the units were in areas classified as coastal or not). However, implementation of this methodology was complex due to numerous constraints, namely:

- **Definition of "regional / coastal zone"** - Eurostat and EC / DGMARE, in the study Blue growth, used the definition: the NUTS III regions with coastline areas, as well as NUTS III without coast area, where more than half the population lives within 50km of the sea. In the preparatory document of the ENM 2013-2020, "The Ocean Economy in Portugal", was adopted this criterion for the accounting of GVA and employment of coastal tourism. A more recent study by Eurostat, in the framework of Tourism Statistics, indicates that the NUTS III level approach is very comprehensive and has another criterion, from which the parishes within each NUTS II, are classified as coastal or no coastal areas, according to the distance to the sea:

• if the parish is by the sea, it is part of the coastal region;

• if the parish is not by the sea, but has 50% of its surface to a 10Km away from the sea, is also considered coastal parish;

all other parishes are considered non-coastal.

In preparing the SAS to Portugal, the working group (Statistics Portugal-DGPM-Turismo de Portugal, I.P.) opted the latest criteria presented by Eurostat (v. Figure 5).

- **Component motivation** - When considering only the geographical component one would be ignoring the motivation component (e.g. not all tourism which takes place in Lisbon and Oporto is related to the sea). Thus, the business component was not included in the SAS estimates.

- **Inclusion of river tourism** - this form of tourism sometimes uses the same means and equipment that "sun and sea" tourism and the same company can operate the means regardless of being in a river or marine environment. The importance of "river tourism" type, within the total tourism related to water (the number of Tourist Animation Agents in national tourism register whose activity is classified as "Water") was not considered relevant.

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Box - Tourism and coastal areas (cont)

Figure 6 - Map of coastal areas in Portugal - LAU-2
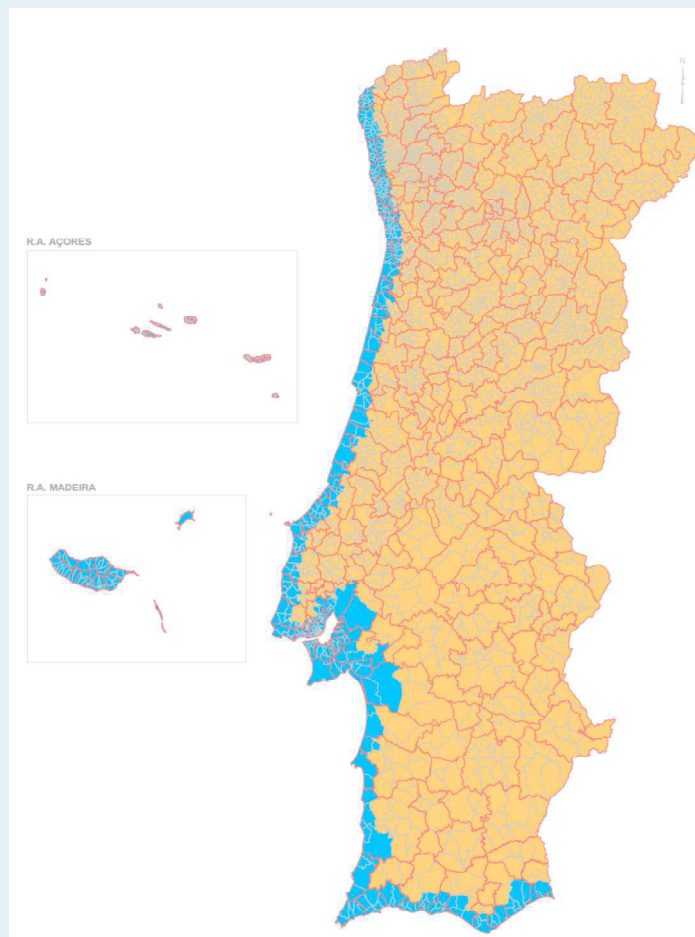
Source: Statistics Portugal, Cartography based on CAOP - Official Administrative Map of Portugal, 2014

The simple application of geographical criteria (i.e. location in the coastal parish) could imply, given the characteristics of the Portuguese territory, an overvaluation of the Sea component (e.g.: not all hotels located in Lisbon chose this location due to the proximity of the sea. Indeed, while capital, Lisbon gathers other attributes beyond the geographical, which justify the choice). In very synthetic terms, the calculation methodology for this component may be summarized as follows:

- Restaurants - the units selected were located in coastal parishes (big restaurant chains and catering companies were not considered). Using detailed information on NA/Tourism accounts it was possible to consider only the consumption for leisure tourism purposes, i.e. the business was not included;

- Hotels - the selected units were located in coastal parishes (the headquarters of hotel chains were not considered). As in the case of restaurants, using detailed information on NA/Tourism accounts it was possible to consider only the consumption for leisure tourism purposes, i.e. the business tourism was not included;

- Imputed rentals of second homes - imputed rents correspond to income associated with assets that families hold in the form of own housing and are the counterpart of accommodation services that this asset provides. Note that the estimated value for these services - the imputed rents - is embedded in GDP. The methodology for measuring the rents to be charged followed by NA resorted to the use of the 2011 Housing and Population Census, more specifically the information on actual rents, and the use of an econometric model of hedonic regression. For purpose of the SAS compilation it was applied the NA accounts methodology to coastal parishes. For the metropolitan areas of Lisbon and Oporto were also consulted real estate experts in order to select only the coastal parishes in which the effect of the proximity of the sea was significant in the context of second homes.

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4. Final considerations

The SAS was an exploratory work based on concepts and compilation practices that are still under development at the international level. On the other hand, the sea economy is a broader concept than the one that was used in the satellite account for statistical purposes. The results presented in this press release include only the direct effects of the activities connected with the sea and are conditional on the adopted methodological choices, given the pilot nature of this project and the available information in some areas. It should be noted also that, according to OECD, any complete ocean economy definition should contemplate, besides the set of economic activities that take place at sea and others that are not performing at sea, but depend on it, also the marine natural capital and the non-marketable services of the marine ecosystems. However, as mentioned above, these activities are not included in the SAS since they are not included in the NA production boundary according to the ESA 2010.