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Economic and Social Analysis of the Uses of the Coastal and Marine Waters in the Mediterranean

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FOREWORD

This report is the result of the work conducted by the Plan Bleu as part of the initial economic and social analysis of the ECAP project, Ecosystem Approach for the Management of Human Activities, conducted by the Coordinating Unit of the MAP. This work has also led to the development of another report entitled "Scoping study for the assessment of the costs of degradation of the Mediterranean marine ecosystems".

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Acronyms

CP(s)	Contracting Party(ies)
COP	Conference of the Parties
COR ESA	Correspondence Group on Economic and Social Analysis
COR GEST	Correspondence Group on Good Environmental Status and Targets
COR MON	Correspondence Group on Monitoring
CU	Coordinating Unit (MAP)
EA	Ecosystem Approach
EC	European Commission
EcAp	Mediterranean Action Plan's Ecosystem Approach Initiative
EcAp CG	EcAp Coordination Group
EEA	European Environmental Agency
EO(s)	Ecological Objective(s)
ESA	Economic and Social Analysis
EU	European Union
EU MS	European Union Member State
EU WG ESA	European Union Working Group on Economic and Social Analysis
FAO	Food and Agriculture Organization of the United Nations
GES	Good Environmental Status
GDP	Gross Domestic Product
GFCM	General Fisheries Commission for the Mediterranean
GNP	Gross National Product
GVA	Gross Value Added
IA	Initial Assessment
ICCAT	International Commission for the Conservation of Atlantic Tunas
INFO/RAC	Information and Communication Regional Activity Centre
MAP	Mediterranean Action Plan
MSFD	Marine Strategy Framework Directive
PAP/RAC	Priority Actions Programme Regional Activity Centre
PAH	Polycyclic Aromatic Hydrocarbons
RAC	Regional Activity Centre
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
SCP/RAC	Regional Activity Centre for Sustainable Consumption and Production
SPA/RAC	Regional Activity Centre for Specially Protected Areas
SoMMCER	State of the Mediterranean Marine and Coastal Environment Report
TEU	Twenty-foot Equivalent Unit (container)
TOE	Tone Oil Equivalent
USD	United Sates Dollar
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNWTO	United Nations World Tourism Organisation
WTTC	World Travel and Tourism Council

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Executive Summary

INTRODUCTION

This report on the Mediterranean Sea Economic and Social Analysis (ESA Report) aims to contribute to the Mediterranean Initial Integrated Assessment (IIA) in the context of the progressive implementation of the MAP Ecosystem Approach (EcAp) Initiative (Step 3), and to complement it with a broader in-depth socioeconomic analysis of key economic activities taking part in or closely related to the Mediterranean marine and coastal environments.

Fisheries, aquaculture, tourism and recreational activities, maritime transport and offshore exploitation of oil and gas are analysed at the scale of the Mediterranean basin as well as at a sub-regional level, fitting Mediterranean sub-basins. Production and socioeconomic indicators are presented for each sector, to characterize its magnitude along with its contribution to the economic and social development of national economies and, by extension, to the development of the Mediterranean region. Environmental pressures and impacts on marine and coastal ecosystems are equally assessed to understand the interaction between economic, social and environmental systems. Expected trends, based on existing prospective studies, are examined for each socioeconomic sector with several purposes: to give a foresight of how they may evolve in the coming years; to estimate their expansion or their recession; and to allow highlighting possible increasing environmental pressures and impacts and their localization. Knowledge of socioeconomic issues at stake is necessary to elaborate effective management policies, with the major aim to decouple human development from environmental damage and degradation.

METHODS AND DATA USED

To this purpose, international, regional and occasionally country statistical services have been consulted to collect and manage under excel databases the most recent available data. Statistics have been generally gathered at the country level. Other sources, such as available national and regional reports, articles of specialized press and industrial data, have also been reviewed to complement data and better comprehend the extent of each activity in the region. Information gaps have been filled by estimates calculated under various assumptions, detailed in the report, so as to provide, as far as possible, a homogenous analysis.

Difficulties encountered have mainly concerned the granularity of the data available, not fine enough for the purpose of the study at regional and sub-regional levels, both in terms of geographical scope and sectorial definition. The geographical scope of such analysis, focusing on coastal and marine areas, is rarely coherent with those of data currently collected by the statistical authorities on a regular basis. This is specifically the case for socioeconomic sectors taking place both inland, on the coast or at sea, such as aquaculture, tourism and recreational activities and extraction of oil and gas. In addition, some countries bordering the Mediterranean Sea are characterized by multiple maritime façades (such as France, Egypt, Israel, Morocco, Spain and Turkey) which are not always considered in national statistics, thus making data disaggregation at the proper level quite laborious. The same difficulty was met for countries presenting maritime façades on multiple sub regional basins, as several Mediterranean countries have coastlines belonging to more than one sub-region (Italy, Greece and Tunisia). Even if sector data existed at national levels, its breaking-up according to the area assessed was challenging.

If availability and quality of socioeconomic data differed among regions or countries, lack of data at the proper aggregation level made difficult the collection of suitable and relevant information for the sector analysis. This is the case for socioeconomic sectors such as fisheries and aquaculture, which are frequently coarsely aggregated together, if not under the general agriculture category. Finally, heterogeneity of data originating from different sources proved to make comparison problematic and not always feasible, especially in case of data collected from national statistic authorities, frequently only available in the national country languages. Owing to these constraints, the results of the economic and social assessment

have been based on a number of estimates and assumptions, in order to illustrate orders of magnitude of the economic activities assessed, in terms of sector main characteristics, production value, gross value added and employment. Data and calculations are presented in Appendix 2.

GLOBAL REGIONAL ASSESSMENT

With the caveats resulting from the difficulties met and the assumptions made to fill the gaps due to lack of relevant data, the Economic and Social Analysis highlighted that in the Mediterranean riparian countries the five key economic sectors assessed generated 360 billion Euros in terms of production value, 190 billion Euros in terms of GVA, and 4.2 million jobs in terms of contribution to employment. These regional figures are detailed by sector and sub-basins.

Fisheries in the Mediterranean Sea

The current picture of fisheries in the Mediterranean is the result of the human exploitation of sea resources over millennia. Production is mainly located in coastal areas and on the continental shelf. The Mediterranean is characterized by high fish biodiversity and by the absence of large single-species stocks; fisheries target mainly small and large pelagics along with demersal (bottom) species. Commercial fisheries remain primarily artisanal, although several stocks are exploited by semi-industrial fleets, namely large pelagics (Bluefin tuna, swordfish). Today, issues such as overfishing of many species and the sustainability of fish stocks are of key concern in the area, since most of the fishing resources are exploited far beyond sustainable levels.

At present, circa 73 000 fishing vessels operate in the Mediterranean Sea, accounting for 6 million tons in terms of deadweight tonnage. A large share of the fleet recorded is made up of small-scale artisanal boats (80%). Fish landings in the region almost reached 1 million tons in 2011 (around 1% of total world captures), and were mainly composed of small pelagics and demersal species. In relation to production value, Mediterranean catches generated in 2008 direct gross revenues of 3 200 million Euros, which rose up to 9 700 million Euros in terms of total (direct, indirect and induced) impacts. Gross value added exceeded 2 000 million Euros. With respect to the commercial trade of fishing products, the region shows a deficit in both tonnage and value. The Mediterranean has been experiencing a constant growing demand for seafood while fishing production has recorded a general declining trend in recent years; these have led to a deficit between imports and exports that amounted to 3.6 billion Euros in 2009. Regarding employment indicators, it has been estimated that the Mediterranean fishing sector provided 230 000 jobs in 2008.

Among Mediterranean sub-regions, the distribution of indicators is variable, illustrating the diversity of situations of the fishing activities. Regarding the fishing fleet, in terms of vessel numbers three sub-regions, e.g. the Western Mediterranean, the Ionian Sea and Central Mediterranean and the Aegean-Levantine Sea present a similar share (around 30%) whereas the Adriatic Sea shows a discreet 12%. In contrast, in terms of fishing capacity assessed through the fishing vessel gross tonnage, the Aegean-Levantine basin shows by far the highest share of gross tonnage (70%). Total catches in 2011 display an unequal distribution across the Mediterranean in two groups, far from being similar to gross tonnage: the Western Mediterranean and the Aegean-Levantine show the highest shares of fishing captures in the region (around 33%) while the Adriatic Sea and the Ionian Sea and Central Mediterranean register around 18%. In contrast, economic values generated by fisheries are more evenly distributed in terms of gross revenues and GVA, the highest share being recorded by far by the Western Mediterranean (37% and 39%, respectively). The Adriatic Sea and the Aegean-Levantine Sea accounted for approximately 1/5 of the Mediterranean gross revenues, closely followed by the Ionian Sea and Central Mediterranean (18%). Social impacts of fishing activities in terms of employment are particularly relevant in the Western Mediterranean (40%), the Ionian Sea and Central Mediterranean and the Aegean-Levantine Sea being both around 25%, while the Adriatic Sea is far behind (12%).

The current fishing capacity in the Mediterranean has been estimated to be several times greater than the one needed to land the amount of fish maximizing the potential economic rent. In this sense, the EC warns that too many fleets are dependent on overfished stocks with respect to maximum sustainable yields, an issue that constitutes one of the core objectives of the reformed Common Fisheries Policy, to be implemented in the coming years. In order to shift the fishing industry to a more sustainable scenario and to maximize sustainable economic rent, Plan Bleu estimations state that the Mediterranean fishing effort would need to be globally reduced by 50%, without considering differences in fishing capacity by vessel type. Likewise, it has also been estimated that only half of the current employment would be needed in a sustainable scenario. The scientific consensus regarding overfishing claims that in the absence of effective managerial action in the coming years, several Mediterranean stocks will suffer a critical collapse. This would entail consequences ranging from the socioeconomic impacts of declining catches on trade and the livelihoods of coastal communities (with the subsequent increase in the dependence on imported seafood); to the environmental costs of an impoverished marine biodiversity and the alteration of the marine trophic web. External factors such as global warming add considerable uncertainty to fisheries management.

The Mediterranean Sea is being subject to increasing fishing pressures resulting from technological improvements and the intensification of the activity. The primary environmental issue regarding fishing pressures in the Mediterranean Sea concerns the overexploitation of resources. According to the EEA, 80% of Mediterranean stocks would be outside sustainable levels. In addition, fishing gears pose -actively or passively- a risk of mortality by entanglement to non-targeted species and even threatened species (cetaceans, seabirds or turtles), and may also act as a vector for NIS introduction and spread. Trawling activities severely damage and destroy seafloor communities, with a particular concern regarding meadows of the Mediterranean endemic *Posidonia oceanica*, which are in result frequently affected in an irrecoverable way. Wastes and litter releases from fishing vessels also contribute to the chronic pollution of marine environments. Finally, underwater noise may cause critical impacts on marine organisms such as marine mammals and fish, although these still remain much unknown and further research is needed for their assessment.

Aquaculture in the Mediterranean Sea

Modern marine aquaculture in the Mediterranean region started during the 1970s. Following world trends, the aquaculture sector has been developing rapidly in the countries surrounding the Mediterranean Sea. The decade 1997-2007 recorded a growth rate of 70% in the aquaculture sector, parallel to the declining of fishing captures, population growth and the rise since 1960s of total demand for fisheries products in the region. Although initially aquaculture focused on shellfish species, research and technological improvements in recent years have focused on the cultivation of high value, high demand finfish species such as turbot, gilthead seabream and European seabass.

In 2011 the Mediterranean aquaculture sector produced 1.2 million tons of marine and brackish species, exceeding the fishing captures sector (< 1 million tons) and representing 3% of world figures. In terms of production value, it generated 2.6 billion Euros, 6% of the world value, and a GVA of 1.9 billion Euros. Regarding employment, it is estimated that in 2008 the aquaculture sector provided directly 123 000 jobs while indirect employment of the combined fishing and aquaculture sectors together would have amounted to 770 000 jobs.

Regarding Mediterranean sub-regions, the Aegean-Levantine basin shows the highest records in terms of production, production value and GVA as well as regarding primary employment, recording shares ranging from 70% to 80% of Mediterranean figures. These results are explained by the high numbers of the aquaculture production in Greece and Turkey and particularly to the huge Egyptian production, which displays an intense activity in the area of the Nile delta. Among the remaining sub-regions, the Western Mediterranean and the Ionian Sea & Central Mediterranean show similar shares regarding production (10%

and 8%, respectively), value and GVA (circa 13%) and employment (8%) while the Adriatic Sea records the lowest figures and accounts for around 3-5% of Mediterranean numbers.

The aquaculture sector in the Mediterranean region is expected to continue developing and diversifying in parallel to the decline of wild stocks and the increasing demand for fish products for human consumption. Some Mediterranean riparian countries have small aquaculture industries with growth potential for the coming years (e.g. Albania, Algeria, Croatia, Israel, Montenegro, Morocco and Tunisia). Countries with a well-developed aquaculture sector, such as EU Member States, recording a level-off of the aquaculture production (due to lack of suitable spaces, environmental issues and managerial regulations) may expand with the use of environmentally friendly production techniques. In this context, estimates point out that the Mediterranean aquaculture sector may show more than 100% growth in terms of production and value, and, accordingly, provide extra jobs.

However, the Mediterranean aquaculture production may also face important environmental challenges. Among main environmental pressures deriving from aquaculture activities, the biological interaction caused by the unintentional release of farmed organisms and the introduction of non-indigenous species into the environment are of major concern, as they may cause alterations in the genetic pattern of wild populations. Cultured organisms may compete with native species for food and space, and might also transfer diseases and parasites. Furthermore, overfeeding in fish farms has been identified as the cause of changes in local benthic community structures due to high food supplies, which favour some organisms over others. Sedentary animals die in waters depleted of oxygen resulting from microbial decomposition, while the mobile population migrate to other areas. Protein and oil diets used to feed farmed species are in most cases obtained from wild stocks and thereby increase the pressure on wild fish populations. Furthermore, improperly managed discharges of effluents from aquaculture facilities, charged with residues of therapeutic products, antifouling agents or uneaten fish feed, may lead to antibiotic pathogen resistance, water eutrophication or oxygen depletion among other major environmental damages.

Tourism and recreational activities

The Mediterranean region is the world's leading tourist destination. Seasonally and spatially concentrated, tourism takes place during the summer holiday months and principally in coastal areas. Since the 1970s, the region has experienced a constant growth of international tourist arrivals which now account for almost one third of world numbers. As a consequence, tourism and recreational activities play a key economic role both in northern and southern Mediterranean riparian countries. While western EU countries (France, Italy and Spain) are today well-consolidated tourist destinations, over the last twenty years eastern and southern countries have recorded the world's highest growth rates regarding international tourism.

It is estimated that in 2011 half of the 300 million international arrivals registered in the Mediterranean region took place in coastal areas, accounting for a significant 15% of world figures. Revenues generated by tourism and recreational activities in coastal areas exceeded 250 billion Euros in 2012, and produced a GVA close to 140 billion Euros. Regarding the contribution of the sector to employment, it is estimated that tourism provides 3.3 million direct jobs and 8.5 million total jobs in coastal Mediterranean areas.

The Western Mediterranean, as a traditional tourist destination in the region, accounts for the largest share of international and domestic arrivals (50% and 65%, respectively) in coastal regions. The Aegean-Levantine Sea, which has recorded a constant increase in its tourism and recreational activities during the last decade, today shows 27% of the international and 21% of national arrivals to the Mediterranean region. Both the Adriatic Sea and the Ionian Sea and Central Mediterranean show the lowest figures of tourist arrivals to the region (around 10% of international and 7% of domestic tourism). Regarding economic and social impacts (gross revenues, GVA, and contribution to employment) the pattern is very similar. The Western Mediterranean shows by far the largest shares (around 50%), followed by the Aegean-Levantine Sea which displays noticeable figures ranging from 25% to 30%, while the Adriatic Sea and the Ionian Sea and Central Mediterranean show marginal shares (~5%).

The northern Mediterranean rim has traditionally recorded the highest tourism activities in the region. On the contrary, current analyses on future trends predict an increasing tourism activity throughout the whole Mediterranean basin and particularly in areas such as the Eastern Mediterranean and the North African countries, which already show far more dynamic growth patterns than mature destinations. Coastal and marine areas offering unique biodiversity features are also expected to attract tourism. However, tourist development in the Mediterranean region will go hand in hand with the strengthening of democratic processes in southern and eastern shores and investments in tourism facilities and equipment, along with a gradual renovation of the current Mediterranean mass-tourism model in favour of different tourist products and services (medical, religious, cultural or environmental).

In spite of being seasonally and spatially concentrated, tourism and recreational activities in the Mediterranean region cause environmental degradation of marine and coastal areas in the long term. Urban development and intense human frequentation generate a wide range of environmental impacts, including coastal landscape degradation, soil erosion and alteration of local hydrodynamics, seafloor damage, pressures on endangered species, straining water resources, or increasing waste and pollution discharges into the sea. In addition, inadequate management of tourism might lead to social impacts, derived from the alteration of the local way of life and competition for resources.

Maritime transport

Maritime transport in the Mediterranean Sea is a buoyant sector which has reported a significant growth in the last decades. The Mediterranean, at the interface of three continents, Africa, Asia and Europe, registers a high maritime transportation activity of goods, energy products and passengers. The Mediterranean is today a major load and discharge centre for crude oil. Approximately 18% of global seaborne crude oil shipments take place within or through the Mediterranean, originating in the eastern Black Sea, Northern Egypt, or in the Persian Gulf and entering the Mediterranean Sea via the Suez Canal. Traffic intensification, vessel size and vessel capacity have considerably grown during the last two decades.

The Mediterranean basin registers more than 600 ports or terminals showing vessel activity, some of them lying among the world top ports in terms of port calls, carrying capacity, container and cargo volume. The current merchant fleet registered in Mediterranean countries is composed of 8 000 vessels, which account for 210 million tons of deadweight tonnage. The carrying capacity of vessels transiting the Mediterranean Sea showed a 30% increase in the last two decades; indeed, 20% of the world seaborne trade takes place in the Mediterranean (exceeding 1.5 billion tons of freight transport), while 34 million TEU recorded in Mediterranean ports account for 10% of world container throughput. In terms of passenger transport, 170 million passengers were recorded in 2010. Regarding economic and social impacts, total revenues of maritime transport (transport services, port services and shipbuilding sectors) amounted in 2010 to 70 billion Euros in the Mediterranean Sea, which generated a GVA exceeding 25 billion Euros. It is estimated that 550 000 jobs were directly created by this sector.

Among Mediterranean sub-regions, maritime transport activities are most intense in the Western Mediterranean and in the Aegean-Levantine Sea. Goods transport (both freight and TEU throughput) in both sub-regions show similar shares of Mediterranean figures (around 40% and 35%, respectively), while the Adriatic Sea and the Ionian Sea and Central Mediterranean are at least 20% below. Regarding passenger transport, the Aegean-Levantine registers the largest share (41%). In contrast, in terms of economic impacts and social impacts, the highest revenues, GVA and contribution to employment are recorded in the Western Mediterranean, which accounts for almost half of the region numbers, followed by the Aegean-Levantine Sea (ranging from 23% to 34%) and lastly by the Adriatic Sea and the Ionian Sea and Central Mediterranean (10%-15%).

The maritime transport sector in the Mediterranean Sea was well-developed before the 2009 financial crisis and, even though it was affected by it, tends to recover rapidly. It is expected that maritime transport routes in the Mediterranean basin increase in the coming years, both in number and traffic

intensity. The future development of new export routes for crude oil from the Caspian region is likely to result in a significant increase in the density of tanker deployment in the eastern Mediterranean. In addition, North European demand for energy might be met by increasing LNG transits via the Mediterranean, particularly intense around the Italian coastline. Prospective scenarios point out that increases in goods transport will depend on factors such as economic growth, price of energy and CO_2, and transport policies, but in all cases the Mediterranean is expected to keep its role as a "transit sea".

The further expansion of the maritime transport sector will go in line with the intensification of associated impacts on the marine and coastal environments. Maritime traffic is at the origin of several pressures: first, 70% of marine pollution is caused by maritime transport through emissions and leaks of hazardous substances (e.g. oil products, chemical products, anti-fouling components...). Second, the presence in the marine environment of marine litter has been linked to a great extent to releases by vessels. Third, direct physical disturbance severely affects habitats and species (marine mammals, turtles and fish), either by collisions or by the generation of underwater noise. Firth, grounding and anchoring critically damage seafloor and alter benthic communities. Finally, transportation of exotic species in ballast waters contributes to their spread and settlement.

Offshore exploitation of oil and gas

Most of the Mediterranean countries have been relatively well explored for hydrocarbons. However, many areas in the South Mediterranean, especially offshore, are underexplored or even unexplored. In 2011, the Mediterranean region's proven oil reserves amounted to 67 billion barrels (9 400 million of toe), which made up 4.6% of the world's proven oil reserves. Three countries - Libya, Algeria and Egypt – hold 94% of the Mediterranean's proven oil reserves, Libya alone accounting for 69%. Regarding natural gas, in 2010 the Mediterranean region had 4.7% of global reserves. Algeria's share was 50%, although the country remains largely underexplored. Current offshore hydrocarbon production in the Mediterranean concentrates in waters of Egypt, Libya, Tunisia, Italy, and, to a lesser extent, Israel, Croatia and Spain, but other areas are promising as off the Levantine coasts (Greece, Lebanon and Cyprus).

The offshore oil production in the Mediterranean Sea has been estimated to 19 million toe for 2011, 12% of the total regional production. Offshore oil production is concentrated in the Aegean-Levantine Sea, mostly in Egyptian waters. In turn, natural gas production has been estimated to 68 million toe (more than 3 times the crude oil production), 32% of the total gas production in the Mediterranean region. Offshore gas production is mostly shared between the Ionian Sea and Central Mediterranean and the Aegean-Levantine Sea. The latter should increase its share in the coming years with the start of the Levant basin province production. Regarding offshore production units, 274 active fields, 20 under development and 170 as potentially exploitable have been documented in the Mediterranean region.

Estimations regarding economic and social impacts of this sector point out that the value of the offshore oil and gas production in the Mediterranean Sea in 2011 amounted approximately to 32 billion Euros, while the GVA generated would have reached 23 billion Euros. In addition, the sector may have provided around 29 000 direct jobs, rising to 400 000 jobs when considering also indirect and induced employment.

The distribution of these activities among Mediterranean sub-regions gives a clear advantage to the Aegean-Levantine Sea, particularly regarding oil production, and also to the Ionian Sea and Central Mediterranean for natural gas production. Both sub-regions account for the largest shares of offshore production of hydrocarbons in the Mediterranean region (ranging 43%– 48%) followed far behind by the Adriatic Sea (9%). The Aegean-Levantine Sea shows the largest shares in terms of production value (53%), GVA (54%) and contribution to employment (50%), closely followed by the Ionian Sea and Central Mediterranean (39%, 38% and 41%, respectively) and leaving behind the Adriatic Sea (8% in all cases). The Western Mediterranean shows a negligible share of the offshore hydrocarbon production sector. There is only a small offshore production zone in Spain, with a slowly decreasing production.

Algeria is currently the largest producer in the Mediterranean for oil and gas, yet its current production is located only onshore.

Following world trends, future offshore hydrocarbon exploitation in the Mediterranean will become progressively deeper. New exploration operations for oil and gas production are under study or currently in process on the coasts of Spain, Croatia, Egypt, Israel, Lebanon, Libya, Tunisia and Turkey, as well as in Maltese and Cypriot waters. Besides, Algeria is preparing to expand its exploration program to offshore areas. Large natural gas reserves could be located off the south-eastern Mediterranean shore, especially in the Levantine basin. Therefore, although the current reserve life of Mediterranean hydrocarbons is estimated to thirty years for oil and fifty years for gas -considering both onshore and offshore production along with current exploitation levels- experts predict an increase in oil drilling and gas in the coming years, mainly in the eastern part of the Mediterranean. In this sense, it is estimated that 3 000 millions toe of undiscovered and technically recoverable natural gas might be present offshore in the Levantine basin. The development of the offshore oil and gas production in the eastern Mediterranean will however be heavily conditioned by the evolution of the regional territorial conflicts together with the development of technological advances allowing the exploitation of deep resources.

Oil and gas exploration and production operations have a variety of potential impacts on the environment, depending on the stage of the process, the nature and sensitivity of the surrounding environment, as well as on pollution prevention and control techniques. Impacts can be classed into two categories. First, ecosystem disturbance due to the presence and operation of structures in the water column and on the bottom, causing underwater noise, vibrations and physical disturbance to fish and marine mammals. Second, marine pollution due to oil spills and produced warm waters, potentially containing dissolved and dispersed oil, polycyclic aromatic hydrocarbons (PAHs), heavy metals, high salt concentrations and radioactive materials. Despite the fact that only 9% of marine pollution from oil is attributable to offshore production, local environmental impacts may be significant depending on the intensity of the activity. In cases of large spills, pollution reaches almost immediately lethal levels to plants, fish, birds and mammals, and consequences may be disastrous they happen close to coastal areas. In all cases, current research reveals the existence of cumulative and long-term impacts. Finally, possible invasions of exotic species may be vectored by ballast waters of assistance/ support ships.

Environmental impacts

The ESA Report also includes a qualitative analysis of expected future socioeconomic trends and the environmental impacts by EcAp Ecological Objectives of each assessed maritime economic sector. The whole analysis aims at providing support for future managerial stages in the Mediterranean region, in the context of the MAP EcAp implementation. Comparison of both environmental and socioeconomic impacts of human activities, while keeping in mind the projected evolution of socioeconomic sectors, may allow the elaboration of future regional recommendations, action plans and programmes of measures.

Scope of the economic and social analysis

The Ecosystem Approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, as stated by the Convention of Biological Diversity. It goes beyond examining single issues, species, or ecosystem functions in isolation. Instead, it recognizes ecological systems for what they are: rich mixes of elements that interact with each other continuously. This understanding is particularly important for coasts and seas, where the nature of water keeps systems and functions connected. The main added value of the Ecosystem Approach (EcAp) Initiative in the context of the Barcelona Convention and the Mediterranean Action Plan (MAP) is a renewed emphasis on implementation and integration that will strengthen the understanding of cumulative impacts and will allow its management and a better focus on priority targets. EcAp brings MAP's many sectoral analyses and management measures into a single integrated framework which will result in an adaptive management strategy that will be periodically monitored, evaluated and revised through a rigorous management cycle.

The MAP recently published the State of the Mediterranean Marine and Coastal Environment Report (SoMMCER) in order to synthesize available knowledge regarding the Mediterranean environment's condition, major drivers and pressures affecting the sea and its coastal inhabitants, current and prospective impacts of collective human activity, and emerging issues in coastal and marine organization and management. Its objective is to meet the needs of decision-makers for a regionally integrated management, in the context of the application of EcAp to the management of human activities in the Mediterranean. The assessment of the Mediterranean environmental status integrates step 3 of MAP's EcAp.

As complementary to the environmental assessment of the state of the Mediterranean marine and coastal ecosystems, and in the framework of the EcAp implementation, an Economic and Social Analysis (ESA) is envisaged to provide descriptive, available and updated socioeconomic information on human activities closely linked to Mediterranean environments. The objective of the MAP's ESA in the context of EcAp is twofold:

- to assess the socioeconomic importance of the major human activities that take place directly in the Mediterranean Sea or that are in close relation to its marine and coastal ecosystems and resources: Fisheries, Aquaculture, Tourism and recreational activities, Maritime transport and Offshore extraction of oil and gas. The analysis has been conducted both at the Mediterranean regional and sub-regional scales (Western Mediterranean, Adriatic Sea, Ionian Sea and Central Mediterranean, and Aegean-Levantine Sea) according to the most recent available data. It provides a descriptive overview of the socioeconomic sectors and highlights the environmental pressures that they cause on marine and coastal ecosystems. An analysis of the availability of existing information and data gaps is also provided. This assessment is the object of the present report.
- to develop an exploratory study on the cost of degradation of the Mediterranean Sea as a result of the anthropogenic exploitation of its natural marine resources. The scoping study on the cost of degradation is conducted according to methods already used and existing case studies carried out in the Mediterranean basin. This exploratory study is presented in a distinct report.

Overall, the MAP's ESA aims at supporting future directions and steps in the continued application of the Ecosystem Approach. ESA on the Mediterranean region intends to set the basis to prepare the future programme of measures for the Mediterranean region, which will make up the set of responses aiming to mitigate the anthropogenic impacts to reach Good Ecological Status (GES) in the Mediterranean.

1 Introduction

1.1 THE MEDITERRANEAN CONTEXT

1.1.1 The Mediterranean Region and the Barcelona Convention

The Mediterranean is the largest of the semi-enclosed seas in Europe, sharing a coastline of 46 000 km for an area of 2.5 million km². The basin stretches more than 3 500 km east to west from the Strait of Gibraltar to the shores of Lebanon and circa 1 000 km north to south from Italy to Morocco and Libya.

The Mediterranean region offers a varied and contrasting topography: landscapes of high mountains, rocky shores, impenetrable scrub, semi-arid steppes, coastal wetlands, sandy beaches and a myriad of islands with various shapes and sizes. Similarly, the region comprises a vast set of coastal and marine ecosystems that deliver valuable benefits to all its coastal inhabitants, including coastal plains, wetlands, brackish water lagoons, estuaries or transitional areas, rocky shores and nearshore coastal areas, sea grass meadows, coralligenous communities, frontal systems and upwellings, seamounts, and pelagic systems. As a result, the Mediterranean has not only a very rich biodiversity but also an exceptionally high rate of endemism both on land and in the sea. Not surprisingly, the Mediterranean is considered one of the top biodiversity hotspots in the world.

Ground of ancient civilizations, the Mediterranean region has long been inhabited and has resulted in a socio-politically complex scenario. At present, twenty-two countries[1] border the sea and the region has a combined population of around 465 million people, out of which 150 million living in the coastal areas, according to UNEP-MAP (2012). Marine and coastal resources have traditionally fed coastal populations, which have developed closely related to the sea. Today, the Mediterranean is under intense pressures deriving from increasing coastal populations and human uses. Forest fires and chronic water shortages constantly threat the region. Inland, many of the ancient agricultural and pastoral regimes are being abandoned because they are no longer economically viable.

In this sense, the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) embodies international partnership to protect the sea, its coasts, and the uses and livelihoods that it supports. The Barcelona Convention provides a governance framework for setting environmental standards and targets as well as for sharing important information for management aiming to achieve several demanding objectives:

- to assess and control marine pollution
- to achieve sustainable management of natural marine and coastal resources
- to integrate the environment in social and economic development
- to protect the marine environment and coastal zones through prevention and reduction of pollution, and, as far as possible, elimination of pollution, whether land or sea-based
- to protect the natural and cultural heritage
- to strengthen solidarity among Mediterranean Coastal States
- to contribute to the improvement of the quality of life

As Contracting Parties to the Barcelona Convention, the Mediterranean countries, together with the European Union, are determined to meet the continuing and emerging challenges of protecting the marine and coastal environment of the Mediterranean while boosting regional and national plans to achieve sustainable development.

[1] Including the Palestinian Territories

1.1.2 The Mediterranean Action Plan's Ecosystem Approach Initiative

The roadmap towards the Ecosystem Approach based management

Marine life in the Mediterranean Sea is today severely threatened by intensive human activities such as fisheries, extraction of natural resources, maritime traffic, pollution and nutrient inputs and coastal urban development. The ability of Mediterranean ecosystems to deliver goods and services is compromised.

For this reason, in 2008 the Contracting Parties (CPs) to the Barcelona Convention recognized the need to better protect the Mediterranean ecosystems by progressively applying the Ecosystem Approach to the management of human activities that may affect the Mediterranean marine and coastal environments, and adopted a roadmap for its implementation (Decision IG 17/6). At its core, the ecosystem-based management recognizes the "linkages between marine ecosystems and human societies, economies and institutional systems, as well as those among various species within an ecosystem and among ocean places that are linked by the movement of species, materials, and ocean currents"[2]. It allows priorities for management to emerge as well as creates efficiency in addressing management and conservation needs.

Decisions IG 17/6 of CoP 15 (2008) "Implementation of the ecosystem approach to the management of human activities that may affect the Mediterranean marine and coastal environment" and IG 20/4 of CoP 17 (2012) "Implementing MAP ecosystem approach roadmap: Mediterranean Ecological and Operational Objectives, Indicators and Timetable for implementing the Ecosystem Approach roadmap adopted by the Contracting Parties to the Barcelona Convention" articulate a systematic process for moving forward towards more effective ecosystem-based management in the Mediterranean.

The implementation of the MAP's EcAp Initiative involves a rational and strategic seven-step process including an integrated assessment of the environmental status of the Mediterranean ecosystems. The seven steps identified for moving towards a more effective, ecosystem-based management are:

1. definition of an Ecological Vision for the Mediterranean
2. setting of common Mediterranean strategic goals
3. identification of important ecosystem properties and assessment of ecological status and pressures
4. development of a set of ecological objectives corresponding to the Vision and strategic goals
5. derivation of operational objectives with indicators and target levels
6. revision of existing monitoring programmes for on-going assessment and regular updating of targets
7. development and review of relevant action plans and programmes

EcAp's Ecological Vision and Strategic Goals

The Ecological Vision for the Mediterranean in the context of EcAp (step 1) has been defined: "a healthy Mediterranean with marine and coastal ecosystems that are productive and biologically diverse for the benefit of present and future generations". Similarly, the strategic goals for marine and coastal areas (step 2) have been established as parts of the same decision, corresponding to the first two steps of a seven-step roadmap. The above-mentioned strategic goals are as follows:

1. to protect, allow recovery and, where practicable, restore the structure and function of marine and coastal ecosystems thus also protecting biodiversity, in order to achieve and maintain good ecological status and allow for their sustainable use
2. to reduce pollution in the marine and coastal environment so as to minimize impacts on and risks to human and/or ecosystem health and/or uses of the sea and the coasts
3. to prevent, reduce and manage the vulnerability of the sea and the coasts to risks induced by human activities and natural events.

[2] McLeod, K. L., and H. M. Leslie, editors. 2009. Ecosystem-Based Management for the Oceans. Island Press, Washington, DC.

The MAP's Ecosystem Approach Initiative is consistent with the EC Marine Strategy Framework Directive (MSFD)[3], the main objective of which being to achieve or maintain the Good Environmental Status (GES) of Member State marine waters by 2020. It is also linked to the "Regular Process for Global Reporting and Assessment of the State of Marine Environment, including Socio-Economic Aspects" established by the Resolution of the UN General Assembly and Law of the Sea (A/64/L.18).

The Definition of the EcAp's Ecological Objectives

A set of eleven Ecological Objectives (EOs) was determined in harmony with the 11 EU MSFD Descriptors for determining GES, according to the environmental characteristics of the Mediterranean region (see Appendix 1). Targets and indicators associated to EOs describe, for each major environmental issue identified, the desired results pursued by the application of the EcAp initiative to the management of human activities. Corresponding Operational Objectives and Indicators (step 5) for each Ecological Objective have been already discussed and set up, and have been submitted to and approved by COP 18 held in Istanbul in December 2013.

The MAP's State of the Mediterranean Marine and Coastal Environment Report

Before countries could collectively adopt an ecosystem approach, it was necessary to take stock of environmental conditions and trends. Assessing the information available on coastal and marine ecosystems and their services in the Mediterranean basin is thus a crucial step. The Initial Integrated Assessment (IIA) completed during 2010-2011 represents step 3 in the EcAp process: collating information on the overall nature of ecosystems in the Mediterranean, including physicochemical and ecological characteristics, drivers and pressures that affect the state of the marine environment, conditions or state of the coastal and marine ecosystems, and expected response of ecosystems if current trends continue.

In 2012 the State of the Mediterranean Marine and Coastal Environment Report – SoMMCER (UNEP/MAP, 2012) was for the first time organised around the 11 EOs agreed by the Contracting Parties to the Barcelona Convention. Biodiversity conservation, coastal dynamics, fisheries management, pollution reduction, marine litter and hydrography are now presented as part of an integrated implementation framework and will be periodically monitored and reviewed through a rigorous six year cycle.

Major drivers and pressures affecting the condition of the Mediterranean Sea and its coastal inhabitants, the current and prospective impacts of human activities, and emerging issues in coastal and marine management are assessed in the SoMMCER, in order to meet the needs of decision-makers for a regionally integrated synthesis at this critical time. The SoMMCER reveals that the state of the Mediterranean coastal and marine environment varies from place to place, but that all parts of the Mediterranean are subject to multiple pressures acting simultaneously and in many cases chronically.

The economic and social analysis

In the context of step 3 of the EcAp Initiative, and complementary to the Integrated Initial Assessment, it has been agreed to develop a socioeconomic analysis aiming to determine how human well-being and economies in the Mediterranean region are inextricably linked to the state of ecosystems. The socioeconomic study of human activities and the understanding of how human welfare is linked to marine environments are intended to contribute to the protection of the marine environment and the sustainable use of the seas by supporting the identification of economically efficient and cost effective policy options (i.e. projects, policies, programmes and courses of action).

Indeed, the increasing appreciation of the important role that ecosystems play in providing goods and services that contribute to human welfare, as well as the growing recognition of the impact of human

[3] Directive 2008/56/EC of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)

actions on ecosystems, have led to the recent interest in integrating ecology and economics. The analysis and estimation of the economic value of ecosystem goods and services are expected to play an important role in conservation planning and ecosystem-based management, so that human actions do not damage the ecological processes necessary to support the flow of ecosystem services on which welfare of present and future generations depend. A lack of economic valuation may lead to underestimations of the importance of such resources and to detriment of the marine ecosystems. As a consequence, there is an increasing consensus about the importance of incorporating the "ecosystem services approach" (MEA, 2005) into resource management decisions despite the fact that quantifying levels and values of these services has proven difficult.

The Correspondence Group on Economic and Social Analysis

A specific governance structure is supporting the MAP Coordinating Unit (MAP CU) for the implementation of the EcAp initiative. Since 2012, the governance structure of the EcAp process has been led by the EcAp Coordinating Group (CG) that replaced the previous Government Designated Experts Group. The EcAp CG consists of MAP Focal Points, the Coordinating Unit, the MAP components and MAP partners to oversee the implementation of the Ecosystem Approach, while identifying progress gaps in the application of the road map and find feasible solutions for the advancement of the EcAp agenda. The first meeting of the EcAp CG was held in 2012 to discuss, among other issues, a governance structure to support the EcAp CG in guiding the EcAp activities and the coordination needed for the development of the monitoring program and the socioeconomic analysis. The meeting agreed on a governance structure formed of three correspondence groups in the process of the application of EcAp in the Mediterranean to support the Coordination Group: the Correspondence Group on Good Environmental Status (COR GEST) and Targets, the Correspondence Group on Monitoring (COR MON) and the Correspondence Group on Economic and Social Analysis (COR ESA).

The Correspondence Group on Economic and Social Analysis (COR ESA Group) is composed of national experts designated by the Contracting Parties through Plan Bleu/ RAC Focal Points, in coordination with the MAP Focal Points, representatives of UNEP/ MAP Secretariat and partners, Regional Activity Centres (PAP/ RAC, SPA/ RAC, REMPEC, INFO/ RAC and SCP/ RAC) as well as international experts selected for their experience in similar initiatives or for their scientific expertise. This group, as well as the actions and activities to be undertaken, is coordinated by Plan Bleu/ RAC in collaboration with the MAP CU.

Key activities of the COR ESA Group are:

1. discuss and agree on the methodologies proposed by Plan Bleu/RAC to adapt and conduct ESA at the regional, sub-regional and national scales; to this purpose, members of COR ESA Group work together to ensure efficient coverage, in-depth discussions and common understanding of the objectives and the nature of the ESA.
2. review and validate the ESA results presented by Plan Bleu/ RAC within the framework and the roadmap defined by the EcAp Coordination Group, in particular for the 2012-2013 biennium. These tasks consist of:
    - An ESA study, conducted at the regional and sub-regional level, of main relevant human activities using the Mediterranean Sea and its coastal zone: Fisheries, Aquaculture, Maritime transport, Tourism and recreational activities, and Offshore oil and gas extraction. The study will complete the socioeconomic aspects of the Initial Integrated Assessment of the Mediterranean Sea and Coastal Areas (part of Step 3 of the EcAp roadmap). It will also be an input, in terms of socioeconomic context and arguments, for the development of the following steps of EcAp, and in particular Step 7, regarding the development and revision of regulations and programmes of measures aiming at maintaining or achieving GES.
    - The ESA includes consideration of a scoping study regarding the costs of degradation of marine environments.

- Common Guidelines for developing ESA at the national level adapted to Mediterranean non-EU countries will serve to foster ESA in Mediterranean non-EU countries, regarding the uses of their national waters and the cost of degradation in view of the development of programmes of measures and policies, and thus fostering ownership and reinforcing the implementation of the EcAp Step 7 at national level.

The COR ESA Group's first meeting was held on the 11-12 April 2013 at Plan Bleu's facilities in Sophia-Antipolis (France). Amongst other decisions and recommendations, the Terms of Reference of the COR ESA Group were agreed upon. The second meeting of the Group, held on the 4-5 June 2014, allowed presenting the provisional ESA reports and suggesting several recommendations for the improvement of their results. The present report has taken into account the Group recommendations.

1.2 THE ECONOMIC AND SOCIAL ANALYSIS AT THE REGIONAL LEVEL

1.2.1 Overall objective

The overall objective of the ESA action is to share knowledge and information to elaborate a common understanding of the social and economic dimensions involved in the EcAp implementation and to foster acquaintance of notions underlying this action by Mediterranean riparian countries. This appropriation is especially relevant as a majority of Mediterranean riparian countries does not belong to the EU and thus is not subjected to enforcement of supranational EU directives aiming at the achievement or maintenance of GES. For these countries, part of the future programs of measures might be decided at their national level, requiring work and collaboration with national policy makers and stakeholders about the potential socioeconomic impacts and benefits of adopting environmental protection measures.

The goal of this action is to provide the socioeconomic context essential to elaborate a grounded program of measures aiming to achieve the EcAp strategic objectives. It will contribute amongst others to the development of reasonable targets at regional, sub-regional and national levels. The establishment of pressure targets emanating from human activities will allow the design of coherent management measures. This activity will enable the Contracting Parties to establish a common understanding and standards with regard to the analysis needed in future EcAp steps, i.e.: consideration of the socioeconomic effects of chosen targets; cost effectiveness analysis of measures; economic incentives to support GES; and exceptions where costs are disproportionate.

1.2.2 Operational objectives

In this context, the operational objectives of the action are to:

- prepare an economic and social analysis at regional and sub-regional scale of the human activities (mainly fisheries, aquaculture, maritime transport, recreational activities, oil industry and offshore) using the Mediterranean Sea and its coastal zone
- elaborate an exploratory study regarding costs of degradation for human wealth in the absence of the implementation of adequate action plans and programmes of measures aiming to achieve or maintain GES

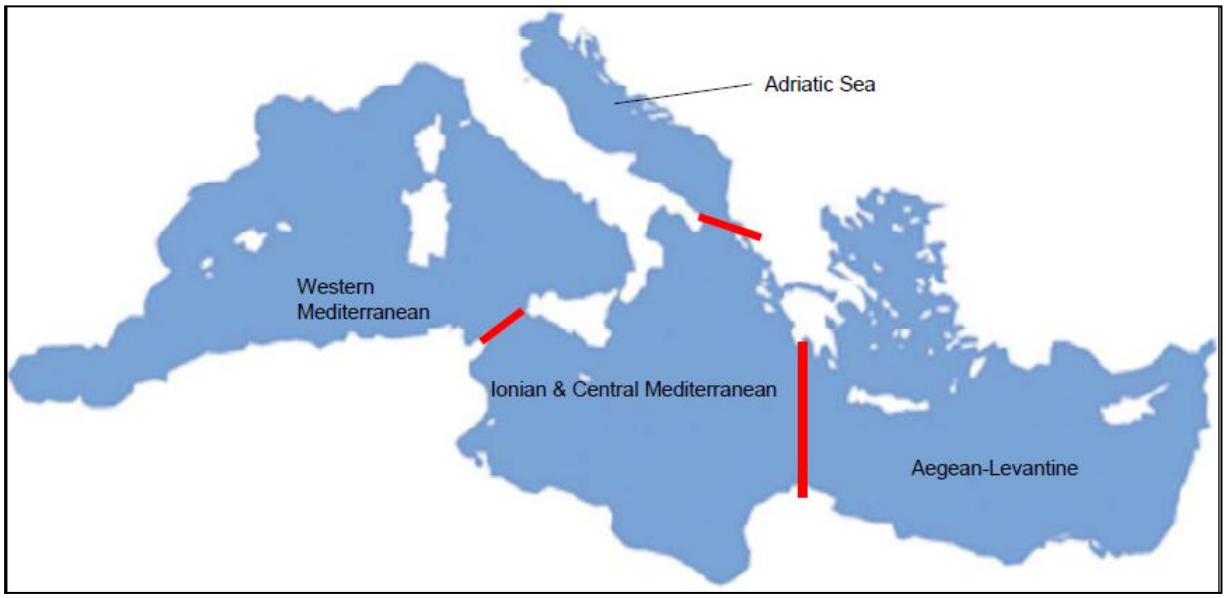
1.2.3 Scope of the report

The object of the present report is the presentation of the results of a socioeconomic analysis of human activities using marine and coastal waters at the regional level. The assessment of the availability and quality of information as well as the identification of knowledge gaps are inherent to the analysis, and are intended to provide guidance for scientific research and monitoring efforts.

In addition, a complementary study carried out through a different report focuses on the costs of degradation for human wealth in the absence of the implementation of suitable action plans and programmes of measures aiming to achieve or maintain GES.

The geographical scope of the regional ESA report is the Mediterranean Sea regional area, covered by the MAP[4], including maritime waters and coastal zones. The assessment is also presented by Mediterranean sub-basins, according to the sub-regions considered by the MAP in the EcAp's Integrated Initial Analysis, i.e.: Western Mediterranean, Adriatic Sea, Ionian Sea & Central Mediterranean, and Aegean-Levantine Sea (see Figure 1, sub-regional basins of the Mediterranean Sea).Conducting the socioeconomic assessment at the sub-regional level might involve some uncertainties deriving from the (un)availability and accessibility of proper data; however, reducing the scale of the analysis allows for a better evaluation of human activities and of the distribution of their impacts, and might facilitate the integration of environmental, economic and social aspects.

Figure 1. Sub-regional basins in the Mediterranean Sea



Source: UNEP/ MAP (2011)

[4] Today MAP involves 21 countries bordering the Mediterranean Sea as well as the European Community: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey.

2 Methods

2.1 THE STATE OF PLAY

The methodological considerations presented here have been used to undertake ESA of the uses of marine waters in the Mediterranean region. They are the outcome of the state of play on Economic and Social Analysis[5] presented during the first COR ESA Group meeting in 2013 and from the recommendations issued by the Group during this meeting[6]. The state of play considered a variety of socioeconomic assessments made or in development at the global, regional and national scales regarding marine and coastal ecosystems, mainly:

- the UN Regular process on the State of the Marine Environment, which includes socio-economic aspects
- the Economic and Social Analysis undertaken by EU Member States to comply with the Marine Strategy Framework Directive (MSFD) requirements regarding the Initial Assessment, considering both the guidelines elaborated by an ad hoc working group (the EU WG ESA) and the assessments made so far by the EU countries, with a specific focus on Mediterranean countries
- the OSPAR Regional Economic and Social Assessment for the MSFD
- the Economic and Social Assessments performed in the framework of the EU FP7 research project PERSEUS
- the assessment of the economic value of sustainable benefits rendered by the Mediterranean ecosystems, an exploratory study carried out by Plan Bleu as part of the EcAp Initial Integrated Assessment

The COR ESA Group agreed to follow the Plan Bleu proposal to use, as far as possible, the guidance developed by the EU WG ESA and to adapt it to the specificities of the Mediterranean region.

2.2 ESA UNDER MSFD

The Economic and Social Analysis in the context of the European Commission for the marine environment is intrinsically linked to Directive 2008/56/EC, the Marine Strategy Framework Directive (MSFD). The MSFD establishes a framework for community action in the field of marine environmental policy within which, Member States (MS) are required to achieve or maintain Good Environmental Status (GES) of their marine waters by 2020. The overall objective is to protect the resource base upon which marine-related economic and social activities depend. Referring to the transboundary nature of the marine environment, the MSFD states that Member States should cooperate to ensure the coordinated development of marine strategies for each marine region or sub-region and recommend that Regional Sea Conventions are involved to ensure such coordination.

In order to implement the MSFD, EU MS have been required to prepare Initial Assessments of their marine waters reflecting three main aspects: i) the analysis of the environmental state of MS marine waters; ii) the analysis of pressures and impacts on the status of these waters and their links with human activities; and iii) an economic and social analysis of the use of marine waters as well as the cost of their degradation (MSFD, art. 8).

Regarding the last requirement (MSFD, art. 8c), a Working Group on the Economic and Social Assessment (WG ESA) has been set up to ensure a common understanding of the requirements of the MSFD, as well as to produce a guidance document to help MS to conduct ESA as defined in the Initial Assessment of MSFD. The guidance document also intends to help practitioners to use the results of

[5] UNEP(DEPI)/MED WG.380/4, 2013, State of play of economic and social analysis
[6] UNEP(DEPI)/MED WG.380/5, 2013, 1st meeting of the correspondence group on ESA, final report

ESA for decision-making and supporting the development of programmes of measures (MSFD, Art. 5). The guidance is only advisory and not binding on MS, which may use other methods. The Initial Assessment being due before the 15th of July 2012, most MS have already transmitted their report to the Commission. However some reports were still not public when consulted for this work (Malta's results on ESA are not publicly available in April 2014). The WG ESA is currently processing an analysis of the EU MS reports regarding methods used and results achieved.

The WG ESA Guidance Document was launched in December 2010 and proposed several approaches and methods to undertake ESA under the Driver-Pressure-State-Impact-Response (DPSIR) framework.

To address the requirements of Article 8c of the MSFD, the document provides guidelines for the development of two distinct and complementary aspects of ESA:

- identification and description of different uses of the marine waters in terms of their economic and social importance and pressures
- description in qualitative terms and if possible in quantitative terms of the cost of degradation of the marine environment

EC -WG ESA (2010) detailed different steps to fulfil the requirements of MSFD ESA:

1. Identification and description of the **different uses of the marine environment** in terms of their economic and social importance and pressures, considering:
   - identification and description of the different uses and pressures on the marine environment
   - assessing direct and, if possible, indirect benefits of the different uses of the marine environment
   - description in qualitative and, if possible, quantitative terms of the pressures caused by the different uses of the marine environment
2. Description in qualitative terms and, if possible, in quantitative terms of the **cost of degradation** of the marine environment

Regarding the use of marine waters, two approaches were proposed, taking into account their pragmatism and the need for available data and information: the Ecosystem Services Approach and the Marine Water Accounts Approach. The former approach is more ambitious, as it aims at identifying marine ecosystem services and, when possible, quantifying and valuing their derived welfare, both estimating use and non-use value. It demands more resources (time and information) than the second approach, which intends to estimate the value of marine environments by taking into account the financial benefits of all sectors that are direct or indirect users of marine waters.

Table 1. MSFD Initial Assessments submitted by Mediterranean EU MS (as by October 2013)

Economic and Social Analysis of the Use of Marine Waters	Cyprus	Greece	France	Slovenia	Spain	Italy	Malta
Ecosystem Services Approach							Not available
Marine Water Accounts Approach	X	X	X	X	X	X	
Cost of degradation							
Ecosystem Services Approach	X	X					
Thematic Approach			X				
Cost-based Approach			X		X	X	
Other				X			
Identifying and Valuing current Marine Ecosystem G&S				X			

Three methods are provided to tackle the cost of degradation of marine environments, i.e. the Ecosystem Services, the Thematic and the Cost-based approaches, which all aim at capturing the potential difference between the current state and the reference condition (GES) of marine ecosystems in terms of monetary value, from different perspectives: the degradation of ecosystem services and loss of welfare, in the first

case; and the associated costs of implementing measures aiming to protect the marine environment and prevent its degradation in the second and third cases.

Table 1 provides an overview of the selected methods that EU MS adopted to carry out ESA in the context of the MSFD's Initial Assessment.

2.3 THE ECONOMIC AND SOCIAL ANALYSIS UNDER ECAP – THE MARINE WATERS ACCOUNTS APPROACH

The first meeting of the COR ESA Group was held in April 2013 in Sophia-Antipolis, France, to undertake the ESA action as part of the implementation of EcAp. Regarding the Economic and Social Analysis of human activities, the Group discussed and exchanged on existing methodologies and country experiences useful to undertake and develop the assessment in the Mediterranean. The Group agreed to develop the analysis both at the Mediterranean Sea regional scale as well as at the sub-regional level according to the following sub-regional breakdown, adopted and widely accepted by the scientific community on the basis of geographical and environmental (physical, chemical and ecological) criteria (see Figure 1):

- the Western Mediterranean
- the Adriatic Sea
- the Ionian Sea and Central Mediterranean
- the Aegean-Levantine Sea

It was equally agreed to develop the analysis as a demonstrative assessment, rather than exhaustive, focusing on key socioeconomic sectors directly or closely linked to the Mediterranean marine environment, e.g.: Fisheries, Aquaculture, Tourism and recreational activities, Maritime transport, and Offshore extraction of oil and gas. Several methodologies allowing the development of the assessment were discussed; the COR ESA Group agreed on the adoption of the Marine Water Accounts Approach as the most adapted to assess human uses of marine ecosystems and socioeconomic benefits in the Mediterranean region. It was also decided that future analyses should focus on other sectors and uses (land based activities, desalinization, cooling water intake and outlet, etc...).

According to the "Marine Water Accounts Approach", the value of marine environments can be estimated by taking into account the economic benefits of all sectors that are direct or indirect users of marine waters. To develop the socioeconomic assessment of human activities in the Mediterranean region in accordance to this methodology, the following structure has been articulated to analyse each sector:

i. introduction, sector description, main sources of data used, methods and assumptions
ii. production indicators, provided in order to give an insight of the magnitude and intensity of the activity (e.g. tons of fish landings as a proxy for captures as well as number of fishing vessels, for fisheries; freight and passenger transport, for maritime traffic; international and domestic arrivals, for tourism and recreational activities; etc.)
iii. production value and gross value added, on account of their common usage at national levels to characterize the economic importance and performance of the sectors, which may allow gathering similar data and ensure the comparability of the information
iv. direct and total contribution to employment, which are widely used indicators, recommended in methodological guidelines (EC WG/EA) and similar analyses (EC IA) to characterize social impacts of maritime activities, since quantitative data regarding social impacts of economic activities are nowadays still scarce
v. trends and future perspectives of each sector, as suggested by existing foresight analysis, to understand the expected evolution of each activity in the coming years and its potential impacts
vi. environmental pressures derived from each socioeconomic activity and impacts on the Mediterranean Sea, inventoried, detailed and classified according to the EcAp's 11 Ecological Objectives
vii. data gap analysis

This methodology is rather ambitious since it aims at providing a standardised descriptive framework allowing the characterization of human drivers according to available and most recent information. The consideration of standard indicators allows the collection of similar information and the comparability of data among countries and sub-regions. However, in the cases where no recent data is publicly available, a series of assumptions were adopted, which are detailed in the corresponding sections.

2.4 THE MEDITERRANEAN SUB-REGIONS

The ESA in the Mediterranean Sea has been performed both at the regional level, which includes the entire Mediterranean basin, and at the sub-regional scale, which focuses on four Mediterranean sub-basins: the Western Mediterranean, the Adriatic Sea, the Ionian Sea and Central Mediterranean, and finally, the Aegean-Levantine Sea.

Some Mediterranean countries present several "maritime façades" bordering more than one sub-basin. In the context of the present report, the concept of "maritime façade" corresponds to the country seaboard or its littoral and marine space bordering a specific marine region or sub-region. In this sense, among the Mediterranean countries considered in the analysis, some have several maritime façades in front of more than one marine region, i.e. France, Morocco and Spain (Atlantic Ocean and Mediterranean Sea); Egypt and Israel (Red Sea and Mediterranean), and Turkey (Black Sea and Mediterranean); as well as in more than one Mediterranean sub-region, i.e. Greece (Central Mediterranean and Aegean Levantine Sea); Italy (Western Mediterranean, Adriatic Sea and Central Mediterranean); and Tunisia (Western and Central Mediterranean).

It should be noted that most of the socioeconomic data are currently collected and available at the national level, sometimes at the regional level and more rarely at the sub-regional one. Consequently, the Mediterranean share of human activities in countries bordered by several regional seas has been estimated when needed using interpolations presented in the document. Sub-regional shares have been frequently estimated by means of ratios based on coastal lengths or extracted from studies and similar analyses (Plan Bleu, EC IAs) focusing on these human drivers.

Although such breakdown might engender uncertainty with respect to the availability and accessibility of data, the consideration of smaller geographic areas allows a better evaluation of human activities and the distribution of their economic and social impacts, and may be useful for the management of marine regions. In this sense, it may support the integration of environmental, economic and social aspects and help understanding the direct links between ecosystems and socioeconomic systems to identify areas of risk for each human activity.

2.4.1 The Western Mediterranean

The Western Mediterranean sub-region includes the marine basins of the Balearic area, the Gulf of Lions and the area of Sardinia. The area of the Balearic Sea registers relatively high productivity rates, and the Gulf of Lions is one of the areas with the highest productivity in the whole Mediterranean basin. In contrast, the zone of Sardinia is characterised by water masses of generally low productivity rates.

Spain, France, Monaco, and Eastern Italy surround the Western Mediterranean on its northern rim, while Morocco, Algeria and Northern Tunisia surround its southern shores. The sub-region is limited on its western side by the strait of Gibraltar. Corsica, Sardinia and the Balearic islands are located within this sub-region.

2.4.2 The Adriatic Sea

The Adriatic Sea is characterised by high productivity rates, particularly in its northern shores, naturally due to strong nutrient outflow from incoming rivers, but also due to agricultural, industrial and urban nutrient inflows. The Adriatic Sea is a narrow sea surrounded by Italy on its western and northern coasts, and by Slovenia, Croatia, Bosnia and Herzegovina, Montenegro and Albania on its eastern shores.

2.4.3 The Ionian Sea & Central Mediterranean

After the Adriatic Sea, the Ionian Sea and Central Mediterranean can be considered as the most productive of the Mediterranean, particularly in terms of fisheries. It is delimited on its northern shores by Sicily and the southern Italian coasts, as well as by eastern Greece. Libya surrounds its southern rim and Eastern Tunisia the western shores.

2.4.4 The Aegean-Levantine Sea

The Aegean-Levantine Sea sub-region includes the Aegean area and the Levant Sea. The Aegean area is characterised by complex bathymetry, narrow continental shelfs, except for its northern part, off the Thraki coasts, and many small islands; it was formerly considered as an area of low biological productivity although in recent years an increase of productivity in the north Aegean Sea has been stated. Many reasons could contribute to these changes, among which are the nutrient inflows from the Black Sea, and from incoming rivers to the north and northwest of the Aegean Sea. Moreover, the increasing eutrophication in some close gulfs, such as Saronic and Thermaikos, has also increased productivity.

On the other hand, the Levant Sea is characterised by a narrow continental shelf, high depth and a low level of biological productivity due to the low nutrient composition of its waters. In the past, the Nile River provided seasonal inflows of sediment and nutrients which were drastically reduced after the construction of the Aswan dam, with immediate impacts on fisheries. The last few decades have seen a significant number of Red Sea species entering in the Eastern Mediterranean (Lessepsian migrants), increasing the biodiversity of the area and changing the state of fisheries in Egypt and Israel.

Greece, Turkey, Syria, Lebanon, Palestine, Israel and Egypt delimit the Aegean-Levantine sub-region.

3 Overview of socioeconomic activities using the Mediterranean waters

3.1 FISHERIES IN THE MEDITERRANEAN SEA

3.1.1 Introduction

General Context

Mediterranean fisheries are highly diverse and vary geographically among riverine countries. They have existed since ancient times and as a consequence the current fisheries pattern is the result of its long history rather than the outcome of a specific management policy (Lleonart and Maynou, 2003).

Evidence of sustained fisheries in the Mediterranean has been documented over millennia. Taking advantage of the great ecological diversity of this enclosed sea, multi-species and multi-gears fisheries were developed over time, and today have come to represent non-negligible socioeconomic sectors in most of the coastal countries. They are an important source of nutrition, employment and income for coastal populations. However, most - if not all- Mediterranean fisheries now face serious challenges: overexploitation of the stocks targeted and poor management of resources are the leading problems; in addition, environmental degradation, coastal development, coastal pollution as well as agricultural and industrial runoff also contribute to the weakening of Mediterranean stocks. Furthermore, climate change is currently starting to aggravate impacts on both ecosystems and species.

Two organizations work and collaborate to guarantee sustainable use and management of fishing resources in the Mediterranean Sea. The Agreement for the Establishment of the General Fisheries Commission for the Mediterranean (GFCM) was approved by the FAO Conference in 1949 and currently consists of 23 Member countries[7] and the EU. It aims to promote the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the Mediterranean, Black Sea and connecting waters. The GFCM is instrumental in coordinating efforts by governments to effectively manage fisheries at regional level and has the authority to adopt binding recommendations for fisheries conservation and management in its Convention Area, playing a critical role in fisheries governance in the region.

In addition, the International Commission for the Conservation of Atlantic Tunas (ICCAT) is an inter-governmental fishery organization responsible for the conservation and management of around 30 tuna and tuna-like species in the Atlantic Ocean and its adjacent seas, including the Mediterranean and Black Seas. ICCAT compiles fishery statistics from its members[8] and from all entities fishing for these species in the Atlantic Ocean, coordinates research including stock assessment, produces relevant publications, develops scientific-based management advice and provides a mechanism for CPs to agree on appropriate management measures.

In spite of the importance of the fishing sector for so many coastal populations, most of the Mediterranean fisheries are currently being exploited at an unsustainable level. A significant feature for most commercial species is that juvenile fish support most of the fishery. Stocks are threatened with overexploitation, as indicated by GFCM and ICCAT in their last assessments, which highlight that most commercial fish stocks are outside safe biological limits.

[7] Albania, Algeria, Bulgaria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Japan, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Romania, Slovenia, Spain, Syria, Tunisia, Turkey.
[8] Today there are 49 CPs to ICCAT, including the European Union and some Mediterranean riparian countries: Albania, Algeria, Egypt, Libya, Morocco, Syria, Tunisia and Turkey.

Mediterranean catches of many fish species peaked in the late 1980s and early 1990s; since then, declining trends have been registered. An analysis prepared for Plan Bleu (Garcia, 2011) regarding Mediterranean fisheries by geographical sectors and groups of species was conducted using a method consisting in the analysis of FAO landings on the long term, according to the development cycle of fisheries (development, maturity, senescence and possible recovery) in the national areas of each riparian country. This study indicates that in the span of 15 years (1991-2006) the percentage of fishery resources in the senescent phase has increased from 15% to nearly 60%, affecting especially the most valuable species (bottom fishes, lobsters) and top predators (tuna, sharks and rays), known to play key roles in the control of the whole trophic chain. The situation is slightly less worrisome in the home fishing areas of southern rim countries, where the number of resources in overexploitation has only increased by a third, while it has more than doubled in those of other Mediterranean countries during the same period (Garcia, 2011). In conclusion, the Mediterranean Sea and the fishing traditions that it sustains are undergoing a period of dramatic change (FAO, 2012).

Commercially exploited stocks in the Mediterranean Sea

The Mediterranean Sea is characterized by a high biodiversity and by the absence of large single-species stocks comparable to those inhabiting wide areas of the open oceans (Lleonart and Maynou, 2003). Large pelagics, small pelagics and demersals constitute three very different groups of fishing resources:

- Small pelagics provide the largest catches in the Mediterranean. Anchovy, sardine, sardinella and sprat make up nearly half of total annual landings. Fleets fishing on small pelagics are semi-industrial or artisanal, using purse seines (with or without light) and pelagic trawls. Traditional pelagic gillnets have almost disappeared for small pelagics.
- The demersal or bottom group is a complex fishery, composed of over 100 species of fishes, crustaceans and molluscs, which usually fetch high prices. Fleets fishing on demersal species are semi-industrial or artisanal. Trawl is the main gear in terms of catch and fleet power, yet artisanal gears (trammel nets, gillnet, bottom longlines, and a number of different traps and drags) are also important. In almost all cases, the exploitation results in multi-species catches.
- Large pelagics, mainly bluefin tuna and swordfish, are caught by the only industrial fleet working in the Mediterranean. The Mediterranean Sea holds the main spawning area for the Eastern Atlantic and Mediterranean bluefin tuna stock. For swordfish, ICCAT considers the existence of a single Mediterranean stock. Large pelagics account for less than 10% of total reported landings, but are of very high economic importance. Regarding gear types, driftnets, longlines and seines exploit bluefin tuna. For swordfish, fishing techniques are longlines and driftnets. Pelagic gillnets are still used for large pelagics. Moreover, there has been a recent huge development of coastal cages to fatten the bluefin tuna to increase quality and make the market independent of the catch season.

Shared stocks in the Mediterranean Sea

Considering small pelagics and demersals, few shared stocks are recognised in the Mediterranean Sea, by comparison to the total number of commercial species. Some small pelagic or demersal stocks in the part of the Gulf of Lions, Gulf of Gabes, Sicily Channel, Adriatic Sea, Ionian and Aegean Sea and Alboran Sea are shared by two or more countries (Lleonart and Maynou, 2003). The list of shared stocks has been published by GFCM (Table 2), which provides regular assessment regarding the status of some commercial stocks.

Table 2. Mediterranean commercial fish stocks shared by two or more countries (GFCM, ICCAT)

Common name	Scientific name	Area	Countries	Exploitation State	Year
Dolphin fish	***Coryphaena hippurus***	Western Mediterranean	Italy, Malta, Spain and Tunisia		
Horned octopus	***Eledone cirrhosa***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Musky octopus	***Eledone moschata***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Anchovy	***Engraulis encrasicolus***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro	Fully exploited	GFCM, 2010
		Aegean Sea	Greece and Turkey	Overexploited	GFCM, 2007
		Gulf of Lions	France and Spain	Fully exploited	GFCM, 2010
Shortfin mako	***Isurus oxyrhinchus***	All Mediterranean	All countries		
Porbeagle	***Lamna nassus***	All Mediterranean	All countries		
European squid	***Loligo vulgaris***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Blackbellied angler	***Lophius budegassa***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Monkfish or angler	***Lophius piscatorius***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Hake	***Merluccius merluccius***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
		Gulf of Lions	France and Spain	Overexploited	GFCM, 2010
		North Tyrrhenian and Corsica	Italy and France	Overexploited	GFCM, 2010
		Sicily Channel	Italy, Tunisia, Libya and Malta		
Blue whiting	***Micromesistius poutassou***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
		North Tyrrhenian and Corsica	Italy and France		
Red mullet	***Mullus barbatus***	Western Mediterranean	Corsica and Sardinia	Overexploited	GFCM, 2003
		Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Striped red mullet	***Mullus surmuletus***	Western Mediterranean	Corsica and Sardinia	Overexploited	GFCM, 2003
Norway lobster	***Nephrops norvegicus***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
		North Tyrrhenian and Corsica	Italy and France	Overexploited	GFCM, 2010
Black spot seabream	***Pagellus bogaraveo***	Alboran Sea and the Straits of Gibraltar	Spain and Morocco		
Common pandora	***Pagellus erythrinus***	Sicily channel	Italy, Tunisia, Libya and Malta	Overexploited	GFCM, 2010
		Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Common spiny lobster	***Palinurus elephas***	Western Mediterranean	Corsica and Sardinia		
		Sicily channel	Italy, Tunisia, Libya and Malta		
Pink spiny lobster	***Palinurus. mauritanicus***	Sicily channel	Italy, Tunisia, Libya and Malta		
Deepwater rose shrimp	***Parapenaeus longirostris***	North Tyrrhenian and Corsica	Italy and France	Moderately exploited	GFCM, 2010
		Sicily channel	Italy, Tunisia, Libya and Malta	Overexploited	GFCM, 2010
		Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Blue shark	***Prionace glauca***	All Mediterranean	All countries		
Sardine	***Sardina pilchardus***	Gulf of Lions	France, Spain	Fully exploited	GFCM, 2010
		Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro	Fully exploited	GFCM, 2007
		Aegean Sea	Greece and Turkey	Moderately exploited	GFCM, 2003

Common name	Scientific name	Area	Countries	Exploitation State	Year
Atlantic mackerel	***Scomber scomber***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Common cuttlefish	***Sepia officinalis***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Common sole	***Solea vulgaris***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Sprat	***Sprattus sprattus***	Adriatic Sea	Albania, Croatia, Italy, Slovenia and Montenegro		
Albacore	***Thunnus alalunga***	All Mediterranean	All countries	Believed fully exploited	ICCAT, 2011
Bluefin tuna	***Thunnus thynnus***	All Mediterranean	All countries	Unknown, believed fully to over-exploited	ICCAT, 2012
Swordfish	***Xiphias gladius***	All Mediterranean	All countries	Overexploited	ICAAT, 2010

Activity description

- Commercial fisheries involve all stages of the process of catching and marketing fish and shellfish for sale (NOAA).
- The present study includes analysis of fishery resources, fishermen, and related businesses of commercial fisheries.
- Commercial fisheries include artisanal fisheries, which are based on traditional or small-scale gear and boats. This study excludes recreational fisheries, due to the scarcity of homogenous national data, although this activity is becoming progressively more and more important in the Mediterranean region.

3.1.2 Methods, data and assumptions

The following section analyses the commercial fisheries sector, as well as its economic and social characteristics. The analysis focuses on the Mediterranean Sea region, and specifically on its sub-regions: Western Mediterranean, Adriatic Sea, Ionian Sea and Central Mediterranean, and Aegean-Levantine Sea.

Production analysis

The sector analysis both at the regional and sub-regional scale takes into consideration fleet characteristics and landing statistics which have respectively been obtained from the GFCM Statistical Bulletins and the FAO-FishStat Dabase.

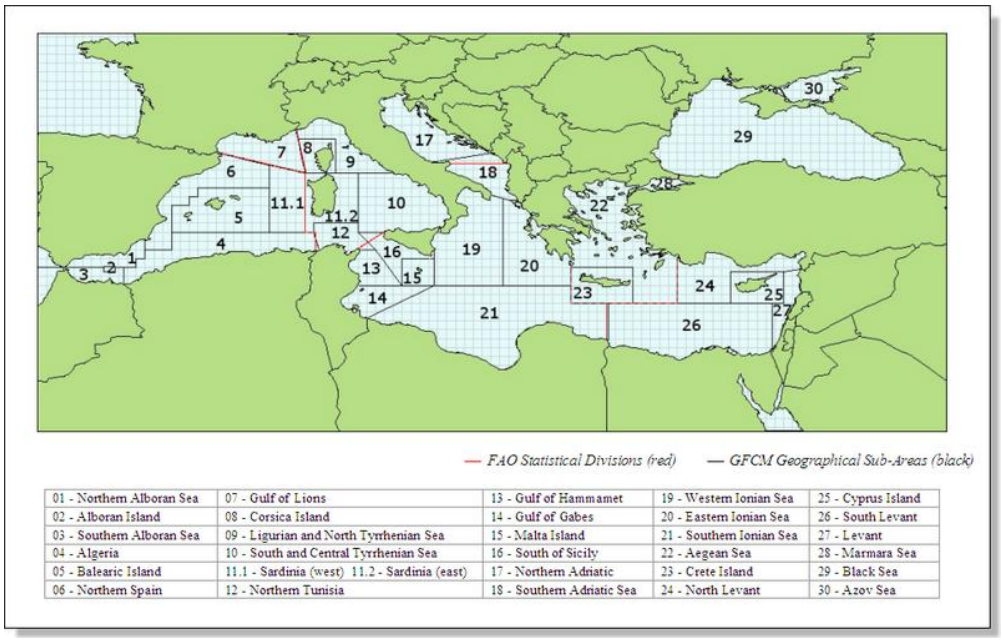
The GFCM Statistical Bulletins are annually published (and available online since 2010) with the most recently reported fleet information. It provides a synopsis of qualitative and quantitative data on fishing vessels, operational units, fishing periods and gears. Information is aggregated by Mediterranean Geographical Sub Areas (GSA) (see Figure 2). The objective is to provide an indication of the fishing effort and capacity exerted yearly in every GSA. For the purposes of the present analysis, fleet data (number of vessels and vessel tonnage) from different GSAs have been aggregated together to present results at the scale of the Mediterranean region as well as at the sub-regional level. The GFCM values presented for each GSA being related to fishing effort and capacity, the approximation used in this analysis might have entailed some double counting in the regions considered (since, for instance, a fishing vessel may be reported in more than one GSA). However, the GFCM has estimated that the figures shown in the present assessment might be affected by an overestimation of less than 1% (GFCM, personal communication).

The FAO-FishStat Database is the most reliable source of information regarding fish landings, and contains annual data from 1950 to 2011 (as when the present study was conducted, in 2013). Data is presented by fish species or group of species, by country and by fishing grounds, allowing distinguishing by different maritime façades[9] in most cases. In this case, landings of Mediterranean countries have been aggregated by

[9] Morocco, Spain, France, Turkey and Egypt have maritime façades belonging to marine environments other than the Mediterranean Sea (Eastern Atlantic, Black and Red Seas, respectively).

group of species (mainly pelagic or demersal) and filtered by their belonging to the Mediterranean and Black Sea fishing area. In the case of Turkey, and as reported in Turkstat (2012), it has been estimated that one third of total annual country fisheries come from its Mediterranean façade (Marmara Sea, Aegean Sea and Mediterranean Sea). For the sub-regional assessment, estimates have been calculated by means of approximate ratios (according to information contained in the IAs submitted to the EC, for Greece and Italy, or to the coastal length of each maritime façade, for Tunisia) in order to characterise uniquely the desired Mediterranean sub-regional façades.

Figure 2. GFCM Geographical Sub-Areas in the Mediterranean Sea



It should be noted that, since the FAO-FishStat Database does not comprise illegal catches and by-catches or any other not declared quantities, landings are underreported and represent only a fraction of the fisheries related mortality.

The FAO-FishStat Database also provides time series of quantities of exported and imported fish per country, in tons, from 1950 until 2011.

Socioeconomic analysis

Landing data are relatively well recorded, whereas fishing production in monetary values is rarely available. In addition, the economic contribution (gross value added) of this sector to the national GDP is generally not available as such and is aggregated with the total agriculture sector's contribution. The FAO Fishery Country Profiles (FAO CP) and FAO National Aquaculture Sector Overview (FAO NASO) factsheets present country data on fishing and aquaculture sectors, including production and indicators of economic performance; however, information is rather old and not regularly updated.

Sacchi (2011) conducted for Plan Bleu an assessment of the fishing and aquaculture sectors in the Mediterranean Sea at regional and sub-regional levels and provided estimates of production in volume, in value as well as of the Mediterranean fishing fleet by segments and associated employment. In Sacchi (2011) scattered data were synthetized and supplemented by expert judgement. Results of this study, particularly when not available elsewhere, have been largely used for the present analysis and updated when possible, even those based on expert judgement.

The economic value of imported and exported fish has been obtained from the FAO-FishStat database. Data is available since 1950 to 2009 for each country and expressed in US Dollars, without detailing the regional origin of imports or destination of exports. Data are aggregated at the national level; therefore,

regional and sub-regional estimates have been calculated by means of approximate ratios (according to the information contained in the IAs submitted to the EC regarding production value, for Greece and Italy, or to the coastal length of each maritime façade, for Egypt, Morocco, Spain, Tunisia and Turkey) in order to provide data characterising uniquely the desired Mediterranean maritime façades.

Data on gross revenues of fisheries along Mediterranean countries are based on the production value of fisheries in the Mediterranean countries, estimated by Sacchi (2011). Total (direct and indirect) economic impacts of fisheries (i.e. the total global economic activity in other sectors supported by fisheries, e.g. canning industries, manufacturing, financial services, etc.) have been estimated by Dyck and Sumaila (2010) at the world scale. Their results show that the total value of fisheries at the global scale –calculated from 2003 data- is approximately three times the landed value. Multipliers by world region are also given, i.e. 2.59 for Asia, 2.59 for Africa and 3.12 for Europe. However, since the present study embraces the Mediterranean countries and, therefore, several different world sub-regions (North-African countries, Western-Asian countries and South-European countries) an average multiplier has been adopted to estimate indirect economic impacts (3.00).

Production value and gross value added regarding the fisheries sector aggregated at the national level are also found in the United Nations Database for most of the world countries, including several Mediterranean riparian countries. However, available data on revenues and GVA refers to both the fisheries and the aquaculture sectors, considers all types of resources (production of fish, shellfish, eggs and larvae, etc.), and includes production in all environments (ocean, coastal and freshwater for fisheries; seawaters and freshwater for aquaculture).

Since no public statistics have been found regarding GVA for fisheries, the UN Data have been used to calculate a coefficient between production value or gross revenues and GVA for each country on which information is available (i.e. Albania, Croatia, Cyprus, France, Greece, Italy, Malta, Morocco, Slovenia and Tunisia). This coefficient has been applied to estimate national GVA from the production value of fisheries in the Mediterranean countries reported by Sacchi (2011). For the countries where data was not reported (i.e. Algeria, Egypt, Israel, Lebanon, Libya, Montenegro, Spain, Syria and Turkey) a ratio based on regional coefficient averages has been used. For Egypt, both gross revenues and GVA for fishing activities have been estimated on the basis of a MedFisis technical report (Seham and Salem, 2004) regarding the present status of fisheries in Egypt, and stating that the agricultural GVA accounts for 17% of total national GDP, and that 8% out of it corresponds to the fisheries GVA.

Finally, data on direct contribution of the fisheries sector to employment have been also obtained from estimations of Sacchi (2011). It should be highlighted that data on employment are poorly documented or aggregated with agriculture in national statistics. In addition, employment in the fisheries sector is often seasonal or shared with other sectors, which adds difficulty to the identification, collection and analysis of data.

It should be noted that, to develop the sub-regional assessment, estimates have been calculated by means of approximate ratios (according to the information contained in the IAs submitted to the EC, for Greece and Italy, or to coastal lengths of each maritime façade, for Tunisia) in order to characterise uniquely the desired Mediterranean sub-regional façades.

Data and calculations are presented in Appendix 2.

3.1.3 Sector and socioeconomic analysis for the Mediterranean regional area

Sector Analysis

- **Fishing vessels per fleet segment**

The fishing fleet is the set of boats used to catch different species. Fishing fleet statistics are generally used as indicators to assess the fishing effort in determined marine areas. Mediterranean countries have registered a total fleet consisting of 125 000 fishing boats (including non-Mediterranean maritime façades). However, a large proportion of this fleet operates outside the Mediterranean Sea: Spain, French, Morocco, Egypt and Turkey also fish in the Atlantic as well as in the Red and Black Seas (Ciheam, 2010).

Considering the latest GFCM bulletins, nearly 73 000 fishing vessels currently operate in the Mediterranean Sea, with a clear predominance of small-scale artisanal vessels over the rest of fishing arts (80% of total fishing boats in the Mediterranean Sea). Trawlers and dredgers make up the second larger group of fishing vessels (11%). Details on the distribution of fishing vessels per fishing practices are shown in Table 3.

Table 3. Fishing vessels per fleet segment in the Mediterranean region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Mediterranean Sea	**57 936**	**7 889**	**3 281**	**317**	**3 397**	**72 820**
% Mediterranean Sea	80%	11%	4%	0,4%	5%	100%

Data from country reports (2008, 2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013) except for Algeria, Croatia and Slovenia, issued from Sacchi (2011).

- **Fishing capacity per fleet segment**

The number of fishing vessels as sole indicator appears insufficient to describe a region's fleet capacity; factors such as tonnage, engine power, length and technology of vessels provide details on the efficiency and performance of the fishing fleet. Vessel tonnage is one of the indicators most frequently used for describing fishing capacity (Sacchi, 2011). In the Mediterranean Sea, small-scale artisanal fishing vessels account for 60% of the total fishing capacity in terms of tonnage, in accordance with fleet numbers. In contrast, the second largest group presenting major tonnages are the small-pelagic seiners (20%) although they only represent 5% in terms of fishing vessel numbers (see Table 4).

Table 4. Vessel tonnage per fleet segment in the Mediterranean Sea

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Mediterranean Sea	**3 853 013**	**260 407**	**1 213 547**	**44 245**	**822 250**	**6 193 463**
% Mediterranean Sea	62%	4%	20%	1%	13%	100%

Data correspond to country reports (2008, 2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013) except for vessels from Algeria, Croatia and Slovenia (which have been excluded due to missing data).

- **Landings (Tons)**

Total catches from the Mediterranean marine capture fisheries rose from 420 000 tons in 1950 to almost one million tons in the 1980s and then reached a recorded peak of 1128 000 tons in 1995. Since then, annual catch level is stabilized around one million tons.

The Mediterranean accounts currently for only a small share of the volumes fished throughout the world (Ciheam, 2010). Total fish catches in the Mediterranean Sea reach values close to one million tons which represent around 1% of world total captures (see Table 5). In the Mediterranean, the most fished groups are the small pelagics and bottom fishes, which together represent 70% of total landings.

Table 5. Landings per group of species in weight (tons) in the Mediterranean Sea

Region	Small pelagic	Medium pelagic	Large pelagic	Sharks and rays	Crustaceans and molluscs	Demersal fishes	Total

Mediterranean Sea	**420 175**	**79 206**	**44 766**	**15 932**	**159 020**	**257 410**	**976 509**
% Mediterranean Sea	43%	8%	5%	2%	16%	26%	100%
World Captures	-	-	-	-	-	-	**78 900 000**
% Mediterranean/ World	-	-	-	-	-	-	1,24%

All data have been extracted from country statistics of the FAO-FishStat Database and correspond to year 2011. Numbers of world fisheries production are provisional estimations for year 2011 (FAO, 2012).

Economic Analysis

- **Economic value and gross value added of fisheries production**

The economic value of total fish landings, i.e. direct values of fish when it changes hands for the first time after leaving the boat, reaches more than 3 200 million Euros in the Mediterranean region, as from data of 2008 (Sacchi, 2011). The average market prices of fresh fishery products are five to ten times higher than those in most other regions of the world (Papaconstantinou and Farrugio, 2000). For that reason, in comparison to total world economic values, the Mediterranean fisheries account for 4.7% of global values although, as noted above, in terms of total world landings the Mediterranean captures only represent 1% (Table 5 and Table 6).

Table 6. Gross value and GVA of the Mediterranean fisheries production

Region	Gross Revenues (Million EUR) Direct Impacts	Gross Revenues (Million EUR) Indirect Impacts	Gross Value Added (Million EUR)****
Mediterranean Sea (2008)	**3 229***	**9 700*****	**2 182**
World Estimates**	69 000 – 73 000	207 000	
% Mediterranean Sea	**4,7%**	**4,7%**	

* Original values expressed in US Dollars, year 2008 (Sacchi, 2011).

**The range of annual world economic values of fisheries has been estimated for the 2000-2010 decade and corresponds to the value of the fish as they first leave the boat (Dyck and Sumaila, 2010). Original values in US Dollars.

***Approximate value of indirect economic impacts of Mediterranean fisheries, as estimated at the global scale for year 2003 (Dyck and Sumaila, 2010). Rounded values.

**** GVA estimates derived from the application of a ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, derived from similar countries.

In addition, total indirect economic impacts of fisheries are estimated at 9 700 million Euros in the Mediterranean Sea using an average multiplier of 3.00 (Dyck and Sumaila, 2010). Besides, the GVA of Mediterranean fisheries is estimated to exceed 2 000 million Euros.

- **Exports / Imports**

The analysis of import and export data for 2009 reveals a trade deficit when considering all Mediterranean countries as a whole, as a result of a growing population in some eastern and western countries and the generalized increase in seafood consumption. It reaches 3.5 billion Euros corresponding to nearly 1.5 million tons of net imported fish in the region. France, Spain and Italy are the countries showing the highest trade deficits; they together represent 75% of total Mediterranean deficit, even if they are also major fish exporters.

Table 7. Quantities and economic value of exports and imports of fishing products in the Mediterranean Sea

Region	Weight (000 Tonnes)			Value (Million EUR)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Mediterranean Sea	765	2 114	**-1 349**	2 170	5 794	**- 3 624**

Adapted from Sacchi et al. (2011) and updated. Adjusted for Mediterranean façades. Source: FishStat (2013). Values correspond to year 2009 and are originally expressed in US Dollars.

- **Subsidies**

Data from subsidy payments to the fisheries sector under the EU's Common Fisheries Policy (CFP) and national policies are compiled under some non-profit projects (e.g. fishsubsidy.org, Sea around us). Subsidy payments to the fisheries sector under the EU CFP and national policies amounted to approximately 6 billion Euros in the period 2000-06. For the period 2007-13 the EU spent 4.3 billion Euros in subsidies to the sector (approximately 837 million Euros per year, for the entire EU area).

Public funds are paid to improve infrastructure, readjust size of the fleet, modernize processing facilities, invest in fish farming and promote more environmentally sustainable fishing. Subsidies for the construction of new fishing vessels were phased out at the end of 2006. However, it is still possible to receive subsidies to modernise vessels, further fuelling over-capacity and over-exploitation of depleted fish stocks. In this sense, the CFP has recently undergone a thorough reform to solve the conflict between priorities for funding, such as support for the reduction of fishing effort and capacity, and aid to modernise and renew the older segments of the European fleet. The objective is to ensure that fishing and aquaculture are environmentally, economically and socially sustainable. To meet this goal, the current policy stipulates that between 2015 and 2020 catch limits are to be set to maintain fish stocks at sustainable levels in the long term.

Data from EU subsidies to Mediterranean MS does not provide a complete picture of all subsidies to the EU fishing industry: the EU also pays approximately 156 million Euros a year to secure access to fisheries in third countries for EU vessels (e.g. Morocco, Gabon, Mozambique, etc.) and furthermore many fishing vessels benefit from tax breaks that reduce the price of diesel fuel. National governments may also provide their own subsidies to their fisheries sectors.

Social Analysis

- **Employment**

Total employment of fisheries in the primary sector, i.e. associated to the direct extract of natural resources and without taking into account indirect and induced jobs, have been estimated by Sacchi (2011) at around 250 000 jobs in 2008. The small-scale artisanal fisheries provide the largest part of jobs (55%), followed by pelagic seiners (22%). Real values of employment are currently difficult to assess due to information gaps, differences in reporting methods and data aggregations.

Table 8. Fisheries employment in the fishing primary sector

Region	Total Employment (Number of jobs*)
Mediterranean Sea	**232 420**

*Estimated values for year 2008 (Sacchi, 2011).

3.1.4 Sector and socioeconomic analysis for the Mediterranean sub-regional areas

Western Mediterranean

The Western Mediterranean is surrounded by Algeria, France, western Italy, Morocco, Spain and northern Tunisia.

Most of the sector information regarding the Mediterranean fishing fleet (i.e. number of vessels and tonnage) has been collected from the GFCM Statistical Bulletins, where it is aggregated at the GSA level. The Western Mediterranean sub-region includes data of GSA 1 to 12. When using these data, results are more accurate since the information covers directly marine areas and allows a better assessment at the sub-regional level.

To characterize the sub-regional picture regarding fish landings, exports and imports as well as socioeconomic data, national data from Algeria, France, eastern Italy, Morocco, Spain and northern Tunisia have been used. Regional ratios have been applied to estimate the Mediterranean share of data

aggregated only at the national level (exports and imports). In addition, on account of the unavailability of country data at the sub-regional level, Italian and Tunisian figures have been estimated from national statistics according to their coastal length belonging to the Western Mediterranean façade.

Sector Analysis

- **Fishing vessels per fleet segment**

Approximately 20 000 fishing vessels operate in the Western Mediterranean, around 30% of the total Mediterranean fleet (Table 9). The majority of these are small-scale artisanal (70%) followed far behind by trawlers and dredgers, which account for 15% in the Western Mediterranean and for almost 40% of the trawler and dredger fleet operating in the Mediterranean Sea.

On the other side, even if small pelagic seiners only account for 9% of the Western Mediterranean fishing vessels, they represent more than 50% of the total small pelagic seiners of the Mediterranean basin.

Table 9. Fishing vessels per fleet segment in the Western Mediterranean sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Western Mediterranean Sea	**14 369**	**2 969**	**1 745**	**67**	**938**	**20 088**
% Western Mediterranean	71%	15%	9%	0% (0,3%)	5%	100%
% Mediterranean Sea	25%	38%	53%	21%	28%	28%
Mediterranean Sea	**57 936**	**7 889**	**3 281**	**317**	**3 397**	**72 820**

Data from country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013) except for Algeria (Sacchi, 2011). Geographic Sub-Areas 1-12 have been considered for the Western Mediterranean sub-region.

- **Tonnage per fleet segment**

In the Mediterranean Sea, the Western Mediterranean fleet only represents 10% in terms of fishing capacity. Tonnage data show that the small-scale artisanal vessels make up the fleet segment deploying major fishing capacity in the Western basin (75%). However, they only represent 13% of the tonnage of small-scale artisanal fishing vessels operating in the Mediterranean basin.

On the contrary, although trawlers and dredgers are under 20% of total fishing capacity in the sub-region, they nearly account for 50% of the fleet segment tonnage in the Mediterranean.

Table 10. Vessel tonnage per fleet segment in the Western Mediterranean sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Western Mediterranean Sea	**492 465**	**122 786**	**25 778**	**13 755**	**14 055**	**668 840**
% Western Mediterranean	74%	18%	4%	2%	2%	100%
% Mediterranean Sea	13%	47%	2%	31%	2%	11%
Mediterranean Sea	**3 853 013**	**260 407**	**1 213 547**	**44 245**	**822 250**	**6 193 463**

Data from country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013) except for vessels from Algeria (which has been excluded due to missing data). Geographic Sub-Areas 1-12 have been considered for the Western Mediterranean sub-region.

- **Landings (Tons)**

Western Mediterranean catches represent 35% of total Mediterranean captures (Table 11). Small pelagics such as sardine and anchovy are among the main targeted species and represent close to half of total catches. Bottom species are the second most fished group in the sub-region (28%).

Table 11. Landings per group of species in weight (tons) in the Western Mediterranean

Region	Small pelagic	Medium pelagic	Large pelagic	Sharks and rays	Crustaceans and molluscs	Demersal fishes	Total
Western Mediterranean	**137 781**	**37 804**	**17 466**	**2 804**	**48 108**	**93 614**	**337 577**
% Western Mediterranean	41%	11%	5%	1%	14%	28%	100%
% Mediterranean Sea	33%	48%	39%	18%	30%	36%	35%
Mediterranean Sea	**420 175**	**79 206**	**44 766**	**15 932**	**159 020**	**257 410**	**976 509**

Adapted and updated from Sacchi (2011).
All data have been extracted from country statistics of the FAO-FishStat Database and correspond to year 2011.

Economic Analysis

- **Economic value of the fisheries production**

Economic impacts of fisheries in terms of production's economic value represent slightly 40% of total Mediterranean value -the highest value in the basin - reaching 1 200 million Euros in terms of direct impacts and 3 600 million Euros in terms of indirect impacts (Table 12).

In addition, the GVA for the fisheries sector has been estimated to be close to 850 million Euros in the Western Mediterranean, by far the highest among Mediterranean sub-region.

Table 12. Gross value of the Western Mediterranean fisheries production

Region	Gross Revenues (Million EUR) Direct Impacts	Gross Revenues (Million EUR) Indirect Impacts**	Gross Value Added (Million EUR)***
Western Mediterranean*	**1 194**	**3 600**	**847**
% Mediterranean Sea	37%	37%	39%
Mediterranean Sea*	**3 229**	**9 700**	**2 182**

*Original values expressed in US Dollars, year 2008 (Sacchi, 2011).
**Approximate value of indirect economic impacts of Mediterranean Fisheries, using multipliers estimated at the global scale for year 2003 (Dyck and Sumaila, 2010). Rounded values.
*** UN Data ratio for national fisheries and aquaculture sector, or when missing, ratio derived from similar countries

- **Export / Imports**

The Western Mediterranean's trade balance shows a deficit of almost 2 billion Euros in 2009, which corresponds to 0.5 million tons of net imported fish (Table 13). The Western Mediterranean is also the sub-region that most exports. Indeed, exports account for 63% of total Mediterranean exports, in tonnage, and 54% in terms of value. However, imports are also major and constitute 46% of total imports in tonnage, and 52% in monetary terms.

Countries contributing the most to trade deficit in this sub-region are Spain and France, which together account for almost 75% of fish imports (in tonnage and value) in the Western Mediterranean, although they also represent 75% of exports. Morocco, in contrast, is the sole Mediterranean country showing a high fish surplus, although this figure may be due to its Atlantic production (Sacchi, 2011).

Table 13. Quantities and economic value of exports and imports of fishing products in the Western Mediterranean

Region	Weight (000 Tonnes)			Value (Million EUR)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Western Mediterranean	479	983	**-504**	1 177	2 991	**-1 814**
% Mediterranean Sea	63%	46%	37%	54%	52%	50%
Mediterranean Sea	765	2 114	**-1 349**	2 170	5 794	**-3 624**

Adapted from Sacchi et al. (2011) and updated. Adjusted for Mediterranean façades only. Source: FishStat (2013). Values correspond to year 2009 and are originally expressed in US Dollars.

Social Analysis

- **Employment**

The Western Mediterranean's fishing sector has a significant importance among Mediterranean sub-regions regarding its contribution to employment. The total number of jobs in the sub-region are estimated close to 95 000 (Table 14), which represent 40% of total direct employment of fisheries in the Mediterranean region (Sacchi, 2011).

Table 14. Fisheries employment in the primary sector - Western Mediterranean

Region	Total Employment in the Primary Sector
Western Mediterranean Sea	**93 920**
% Mediterranean Sea	40%
Mediterranean Sea	**232 420**

Estimated values for year 2008 (Sacchi, 2011).

Adriatic Sea

The Adriatic Sea is surrounded by Albania, Bosnia and Herzegovina, Croatia, eastern Italy, Montenegro and Slovenia.

Most of the sector information regarding the Mediterranean fishing fleet (i.e. number of vessels and tonnage) has been collected from the GFCM Statistical Bulletins, where it is aggregated at the GSA level. The Adriatic Sea analysis includes information of GSA 17 and 18.

The analysis regarding fish landings, exports and imports as well as socioeconomic data in the Adriatic Sea has been conducted taking into account national data of Albania, Bosnia and Herzegovina, Croatia, western Italy, Montenegro and Slovenia. On account of the unavailability of country data at the sub-regional level, Italian figures have been estimated according to its coastal length belonging to the Adriatic Sea façade.

Sector Analysis

- **Fishing vessels per fleet segment**

Approximately 9 000 fishing vessels operate in the Adriatic Sea, which represent 12% of the total Mediterranean fleet, the lowest figures among Mediterranean sub-regions. As for the Western Mediterranean, the majority of these are small-scale artisanal (61%). The second largest group consists of trawlers and dredgers, which account for one third of fishing boats in this sub-region and which also represent more than one third of total trawlers and dredgers in the Mediterranean basin.

Table 15. Fishing vessels per fleet segment in the Adriatic Sea sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Adriatic Sea	**5 443**	**2 876**	**593**	**23**	**35**	**8 970**
% Adriatic Sea	61%	32%	7%	0 (0.3%)	0 (0.4%)	100%
% Mediterranean Sea	9%	36%	18%	7%	1%	12%
Mediterranean Sea	**57 936**	**7 889**	**3 281**	**317**	**3 397**	**72 820**

Data from country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013) except for Croatia and Slovenia (Sacchi, 2011). Geographic Sub-Areas 17 and 18 have been considered for the Adriatic Sea sub-region.

- **Tonnage per fleet segment**

In terms of vessel tonnage, the Adriatic Sea fleet represents 1% -a marginal part- of the Mediterranean total fishing capacity. Data show that trawlers and dredgers is the fleet segment deploying the major fishing capacity in this sub-region (73%), which represents almost 20% of the total tonnage of trawlers and dredgers in the Mediterranean basin. The small pelagic seiners, the second largest group in terms of fishing capacity, represent 20% of total tonnage in the Adriatic Sea but account for a small proportion of the entire Mediterranean tonnage (1%). It is worth noting that, although the small-scale artisanal vessels segment is the first in number for this sub-region, they only represent 6% in terms of tonnage (see Table 15 and Table 16).

Table 16. Vessel tonnage per fleet segment in the Adriatic Sea sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Adriatic Sea	**3 532**	**45 647**	**12 806**	**0**	**784**	**62 770**
% Adriatic Sea	6%	73%	20%	0	1%	-
% Mediterranean Sea	0,1%	17,5%	1,1%	0,0%	0,1%	1,0%
Mediterranean Sea	**3 853 013**	**260 407**	**1 213 547**	**44 245**	**822 250**	**6 193 463**

Data from country reports (2008-2010) published for each GFCM/ GSA in GFCM Statistical Bulletins (2011, 2013) except for vessels from Croatia and Slovenia (which have been excluded due to missing data). Geographic Sub-Areas 17 and 18 have been considered for the Adriatic Sea sub-region.

- **Landings (Tons)**

In spite of a relatively low vessel number and tonnage, the Adriatic Sea shows a significant amount of catches: more than 150 000 tons of fish represent almost 20% of total Mediterranean landings. In this sense, it is worth stressing that the Adriatic Sea is one of the few areas in the Mediterranean showing high levels of biological production, which goes in combination with high fishing efficiency. Pelagic species represent 60% of the sub-regional captures, which are dominated by the small pelagic species; while crustaceans and molluscs, along with demersal species account for the remaining 40% (Table 17).

Table 17. Landings per group of species in weight (tons) in the Adriatic Sea

Region	Small pelagic	Medium pelagic	Large pelagic	Sharks and rays	Crustaceans and molluscs	Demersal fishes	Total
Adriatic Sea	**86 971**	**5 144**	**5 609**	**983**	**32 242**	**32 410**	**163 360**
% Adriatic Sea	53%	3%	3%	1%	20%	20%	100%
% Mediterranean Sea	21%	6%	13%	6%	20%	13%	17%
Mediterranean Sea	**420 175**	**79 206**	**44 766**	**15 932**	**159 020**	**257 410**	**976 509**

Adapted and updated from Sacchi (2011).
All data have been extracted from country statistics of the FAO-FishStat Database and correspond to year 2011.

Economic Analysis

- **Economic Value and GVA of the Fisheries Production**

Economic impacts of fisheries in the Adriatic Sea represent close to 25% of the total Mediterranean value. The fisheries sector reaches 750 million Euros in terms of direct impacts and 2 250 million Euros in terms of indirect impacts which, although close to the Aegean-Levantine values, are the second highest values among sub-regions after the Western Mediterranean (

Table 18). Italy and, to a lesser extent, Croatia, register the higher sector revenues in the Adriatic Sea (Sacchi, 2011)

Gross value added derived from fishing activities in the Adriatic Sea have been estimated to 450 million Euros, 21% of the Mediterranean GVA.

Table 18. Gross value of the Adriatic Sea fisheries production

Region	Gross Revenues (Million EUR) Direct impacts	Gross Revenues (Million EUR) Indirect impacts**	Gross Value Added (Million EUR)***
Adriatic Sea*	**751**	**2 250**	**448**
% Mediterranean Sea	23%	23%	21%
Mediterranean Sea*	**3 229**	**9 700**	**2 182**

*Original values expressed in US Dollars, year 2008 (Sacchi, 2011).
**Approximate value of indirect economic impacts of Mediterranean Fisheries, using multipliers estimated at the global scale for year 2003 (Dyck and Sumaila, 2010). Rounded values.
*** UN Data ratio for national fisheries and aquaculture sector, or when missing, ratio derived from similar countries.

- **Exports / Imports**

A deficit of almost 1 billion Euros, corresponding to 0.3 million tons of net imported fish, is observed in 2009 in the Adriatic Sea (Table 19). Italy alone accounts for more than half the sub-regional exports (55%) and 80% of imports, in terms of tonnage; and 56% and 88% respectively, in terms of value. Regarding the rest of the countries in the Adriatic Sea, none of them are major importers or exporters of fish produces. In general, they import more than they export, in terms of tonnage. Some of them are relatively well-balanced (i.e. Albania, Croatia), although they generally show a slight trade deficit.

Table 19. Quantities and economic value of exports and imports of fishing products in the Adriatic Sea

Region	Weight (000 Tonnes)			Value (Million EUR)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Adriatic Sea	81	393	**-311**	254	1 221	**-967**
% Mediterranean Sea	11%	19%	23%	12%	21%	27%
Mediterranean Sea	765	2 114	**-1 349**	2 170	5 794	**-3 624**

Adapted from Sacchi et al. (2011) and updated. Adjusted for Mediterranean façades only. Source: FishStat (2013). Values correspond to year 2009 and are originally expressed in US Dollars.

Social Analysis

- **Employment**

Estimates show that total employment in the Adriatic Sea accounts for 27 000 jobs (Table 20), a modest 12% of the total direct employment of fisheries in the Mediterranean Sea region (Sacchi, 2011).

Table 20. Fisheries employment in the primary sector - Adriatic Sea

Region	Total Employment In The Primary Sector
Adriatic Sea	**27 310**
% Mediterranean Sea	12%
Mediterranean Sea	**232 420**

Estimated values for year 2008 (Sacchi, 2011).

Ionian Sea and Central Mediterranean

The Ionian Sea and Central Mediterranean is surrounded by southern Italy, Libya, Malta, Tunisia as well as eastern Greece.

Most of the sector information regarding the Mediterranean fishing fleet comes from the GFCM Statistical Bulletins, where it is aggregated at the GSA level. The Ionian Sea and Central Mediterranean includes data of GSA 13 to 16 and 19 to 21.

The analysis concerning landings, exports and imports and socioeconomic information includes national data of eastern Greece, southern Italy, Libya, Malta and northern Tunisia. In the cases of Greece and Italy, ratios based on fishing landings and their economic and social performances have been extracted from their Initial Assessments submitted in 2012 to the EC and used for the sub-regional analysis. In the case of Tunisia, results have been estimated from national statistics and pondered according to the Tunisian coastal length belonging to this sub-region.

Sector Analysis

- **Fishing vessels per fleet segment**

More than 20 000 fishing vessels operate in the Ionian Sea and Central Mediterranean, 30% of the total Mediterranean fleet. A broad majority is made up of small scale artisanal vessels. On the other hand, it is worth highlighting that even if tuna seiners represent a marginal proportion of the total sub-region fleet, they account for 40% of the total tuna seiner fleet in the Mediterranean Sea.

Table 21. Fishing vessels per fleet segment in the Ionian Sea and Central Mediterranean Sub- region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Ionian Sea and Central Med	**18 004**	**1 406**	**528**	**127**	**1 698**	**21 763**
% Ionian Sea and Central Med	83%	7%	2%	0% (0.6%)	8%	100%
% Mediterranean Sea	31%	18%	16%	40%	50%	30%
Mediterranean Sea	**57 936**	**7 889**	**3 281**	**317**	**3 397**	**72 820**

Data correspond to country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013). Geographic Sub-Areas 13-16 and 19-21 have been considered for the Ionian Sea and Central Mediterranean sub-region.

- **Fishing capacity per fleet segment**

In terms of vessel tonnage, the Ionian Sea and Central Mediterranean fleet represents only 17% of the Mediterranean total fishing capacity. Data show that small-scale artisanal fishing vessels are by far the fleet segment deploying major fishing capacity in this sub-region (71%), representing 20% of the total tonnage of small-scale artisanal boats in the Mediterranean basin.

The small pelagic seiners, the second largest group in terms of fishing capacity, represent not even 15% of total tonnage in the Ionian Sea and Central Mediterranean and account for a rather low proportion of the entire Mediterranean tonnage for this fleet segment (12%). In contrast, the tuna seiners represent a marginal proportion of the total sub-regional fleet's tonnage, yet they constitute 13% of the total Mediterranean tuna seiners in the Mediterranean, in terms of fishing capacity (Table 22).

Table 22. Vessel tonnage per fleet segment in the Ionian Sea and Central Mediterranean sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Ionian Sea and Central Med	**760 691**	**71 216**	**146 218**	**5 800**	**87 963**	**1 071 887**
% Ionian Sea and Central Med	71%	7%	14%	0 (0,5%)	8%	100%
% Mediterranean Sea	20%	27%	12%	13%	11%	17%
Mediterranean Sea	**3 853 013**	**260 407**	**1 213 547**	**44 245**	**822 250**	**6 193 463**

Data correspond to country reports (2008-2010) published for each GFCM/ GSA in GFCM Statistical Bulletins (2011, 2013). Geographic Sub-Areas 13-16 and 19-21 have been considered for the Ionian Sea and Central Mediterranean sub-region

- **Landings (Tons)**

Around 130 000 tons account for a rather moderate proportion of total Mediterranean landings (18%) in spite of the high numbers of fishing vessels in the Ionian Sea and Central Mediterranean.. Captures are mostly composed of pelagic species (almost 50%) and bottom fish species (30% of catches).

On the other hand, it is worth noting the Ionian Sea and Central Mediterranean nearly accounts for almost half of the total catches of sharks and rays in the Mediterranean basin (Table 23).

Table 23. Landings per group of species in weight (tons) in the Ionian Sea and Central Mediterranean sub-region

Region	Small pelagic	Medium pelagic	Large pelagic	Sharks and rays	Crustaceans and molluscs	Demersal fishes	Total
Ionian and Central Med	**52 919**	**15 781**	**10 889**	**7 317**	**34 897**	**55 258**	**177 061**
% Ionian Sea and Central Med	30%	9%	6%	4%	20%	31%	100%
% Mediterranean Sea	13%	20%	24%	46%	22%	21%	18%
Mediterranean Sea	**420 175**	**79 206**	**44 766**	**15 932**	**159 020**	**257 410**	**976 509**

Adapted and updated from Sacchi (2011).
All data has been extracted from country statistics of the FAO-FishStat Database and correspond to year 2011.

Economic Analysis

- **Economic value and GVA of fisheries production**

In accordance to landing values, direct and indirect economic impacts of fisheries in the Ionian Sea and Central Mediterranean represent only 18% of the total Mediterranean value, the lowest registered numbers amongst the Mediterranean. Direct impacts of fisheries reach 600 million Euros while indirect impacts account for 1.8 billion Euros.

Similarly, GVA in the sub-region only amounts to 550 million Euros, which represent 25% of regional figures.

Table 24. Gross value and GVA of the Ionian Sea and Central Mediterranean fisheries production

Region	Gross Revenues (Million EUR) Direct impacts	Gross Revenues (Million EUR) Indirect impacts**	Gross Value Added (Million EUR)***
Ionian Sea and Central Mediterranean*	**596**	**1 790**	**550**
% Mediterranean Sea	18%	18%	25%
Mediterranean Sea*	**3 229**	**9 700**	**2 182**

*Original values expressed in US Dollars. Values correspond to year 2008 (Sacchi, 2011).
**Approximate value of indirect economic impacts of Mediterranean Fisheries, using multipliers estimated at the global scale for year 2003 (Dyck and Sumaila, 2010). Rounded values.
*** UN Data ratio for national fisheries and aquaculture sector, or when missing, ratio derived from similar countries

- **Exports / Imports**

The trade balance of the Ionian Sea and Central Mediterranean follows the general Mediterranean pattern and is characterized by a deficit of 900 million Euros in 2009, on account of the 25 000 tons of net imported fish (Table 25). All the countries in the sub-region import more than export in tonnage; they all show fish trade deficits in value except for Tunisia, showing a high trade surplus due to the price advantage of its exports, which is insufficient to reverse the fish trade deficit at sub-regional level.

Table 25. Quantities and economic value of exports and imports of fishing products

Region	Weight (000 Tonnes)			Value (Million EUR)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Ionian Sea and Central Med	82	337	**-254**	291	921	**-629**
% Mediterranean Sea	11%	16%	19%	13%	16%	17%
Mediterranean Sea	765	2 114	**-1 349**	2 170	5 794	**-3 624**

Adapted from Sacchi et al. (2011) and updated. Adjusted for Mediterranean façades only. Source: FishStat (2013). Values correspond to year 2009 and are originally expressed in US Dollars.

Social Analysis

- **Employment**

Total employment of fisheries in the Ionian Sea and Central Mediterranean reaches more than 55 000 jobs (Table 26), a significant figure accounting for a quarter of total direct jobs in the Mediterranean Sea region (Sacchi, 2011).

Table 26. Fisheries employment in the primary sector - Ionian Sea and Central Mediterranean

Region	Total Employment in the Primary Sector
Ionian Sea and Central Mediterranean	**55 940**
% Mediterranean Sea	24%
Mediterranean Sea	**232 420**

Estimated values for year 2008 (Sacchi, 2011).

Aegean-Levantine Sea

The Aegean-Levantine Sea covers the eastern part of the Mediterranean and is surrounded by Cyprus, Egypt, eastern and southern Greece, Israel, Lebanon, Palestinian Territories, Syria and Turkey.

The sector information regarding the Mediterranean fishing fleet comes from the GFCM Statistical Bulletins, where it is aggregated at the GSA level. The Aegean-Levantine Sea analysis includes information of GSA 22 to 27.

In the case of Greece, several ratios based on fish landings and regarding the economic and social performances of the sector have been extracted from the MSFD Initial Assessment submitted by Greece to the EC.

Sector Analysis

- **Fishing vessels per fleet segment**

A total fishing fleet composed of 22 000 fishing vessels operates in the Aegean-Levantine Sea (30% of the total Mediterranean fleet). A broad majority of total fishing vessels are small-scale artisanal (92%) and accounts for more than one third of the small-scale artisanal fleet in the Mediterranean. The remaining fishing boats together account for only 8% of the sub-regional fleet. Again, and as for the Ionian Sea and Central Mediterranean, the tuna seiner fleet of the Aegean-Levantine Sea is negligible when compared to the total sub-regional fleet but accounts for one third of the total tuna seiners in the Mediterranean basin (Table 27).

Table 27. Fishing vessels per fleet segment in the Aegean-Levantine Sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Aegean-Levantine Sea	**20 120**	**638**	**415**	**100**	**726**	**21 999**
% Aegean-Levantine Sea	92%	3%	2%	0 (0.5%)	3%	100%
% Mediterranean Sea	35%	8%	13%	32%	21%	30%
Mediterranean Sea	**57 936**	**7 889**	**3 281**	**317**	**3 397**	**72 820**

Data from country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013). Geographic Sub-Areas 22-27 have been considered for the Aegean-Levantine sub-region.

- **Fishing capacity per fleet segment**

In terms of vessel tonnage, the Aegean-Levantine Sea fleet accounts for the largest share of the total Mediterranean fishing capacity (71%). In this case, the small-scale artisanal vessels are also the fleet segment with higher tonnage in this sub-region (60%); in addition, they represent more than two thirds of total Mediterranean tonnage in for this segment (Table 28).

The small pelagic seiners, the second largest segment in terms of fishing capacity, make up a quarter of total tonnage in the Aegean-Levantine Sea but account for a very large fraction of the entire Mediterranean tonnage for this fleet segment (85%). Similarly, polyvalent vessels- which account for a moderate 16% of total sub-regional tonnage- represent a very large share of total polyvalent vessel's tonnage at the scale of the Mediterranean Sea.

Finally, the tuna seiners account for an insignificant fraction of the total sub-regional fleet's tonnage, yet they constitute more than half of total tuna seiners' tonnage in the Mediterranean Sea.

Table 28. Vessel tonnage per fleet segment in the Aegean-Levantine sub-region

Region	Small-scale artisanal fishing vessels	Trawlers and dredgers	Small-pelagic seiners	Tuna seiners (> 12 m)	Polyvalent vessels (> 12 m)	Total
Aegean-Levantine Sea	**2 596 325**	**20 758**	**1 028 745**	**24 690**	**719 449**	**4 389 967**
% Aegean-Levantine Sea	60%	0 (0.5%)	23%	0 (0.6%)	16%	100%
% Mediterranean Sea	67 %	8%	85%	56%	87%	71%
Mediterranean Sea	**3 853 013**	**260 407**	**1 213 547**	**44 245**	**822 250**	**6 193 463**

Data from country reports (2008-2010) published for each GFCM/ GSA by GFCM (Statistical Bulletins 2011 and 2013). Geographic Sub-Areas 22-27 have been considered for the Aegean-Levantine sub-region.

- **Landings (Tons)**

Landings in the Aegean-Levantine Sea register relatively high figures among Mediterranean sub-regions. Circa 300 000 tons account for one third of total Mediterranean landings, and are mostly composed of bottom fish and pelagic species (together, 85% of catches).

Table 29. Landings per group of species in weight (tons) in the Aegean-Levantine Sea

Region	Small pelagic	Medium pelagic	Large pelagic	Sharks and rays	Crustaceans and molluscs	Demersal fishes	Total
Aegean-Levantine Sea	**142 505**	**20 477**	**10 802**	**4 828**	**43 772**	**76 127**	**298 511**
% Aegean-Levantine Sea	48%	7%	4%	2%	15%	26%	100%
% Mediterranean Sea	34%	26%	24%	30%	28%	30%	31%
Mediterranean Sea	**420 175**	**79 206**	**44 766**	**15 932**	**159 020**	**257 410**	**976 509**

Adapted and updated from Sacchi (2011).
All data has been extracted from country statistics of the FAO-FishStat database and correspond to year 2011.

Economic Analysis

- **Economic Value and GVA of Fisheries Production**

Direct and indirect economic impacts of fisheries in the Aegean-Levantine Sea, approximately 700 million Euros and 2 100 million Euros respectively, represent just over 20% of total Mediterranean values (Table 30).

On the contrary, the GVA of the sector, which amounts to 340 million Euros, accounts for a modest 15% of the regional GVA.

Table 30. Gross value of the Aegean-Levantine Sea fisheries production (Sacchi, 2011)

Region	Gross Revenues (Million EUR) Direct impacts	Gross Revenues (Million EUR) Indirect impacts**	Gross Value Added (Million EUR)***
Aegean-Levantine Sea*	**687**	**2 060**	**337**
% Mediterranean Sea	21%	21%	15%
Mediterranean Sea*	**3 229**	**9 700**	**2 182**

*Original values expressed in US Dollars, year 2008 (Sacchi, 2011). No data available neither for, Lebanon nor for Palestinian Territories.

**Approximate value of indirect economic impacts of Mediterranean Fisheries, using multipliers estimated at the global scale for year 2003 (Dyck and Sumaila, 2010). Rounded values.
*** UN Data ratio for national fisheries and aquaculture sector, or when missing, ratio derived from similar countries

- **Exports / Imports**

In 2009, the trade balance of the Aegean-Levantine Sea shows a trade deficit. In this case, almost 0.3 million tons of net fish imports lead to a deficit over200 million Euros (Table 31). All countries considered in the Aegean-Levantine Sea sub-region import more than export in terms of tonnage. Greece, Turkey and Israel together account for 70% of total imports in the sub-region, while Greece is widely the largest exporter in terms of tonnage (75% of the sub-regional exports). Most of the countries show fish trade deficits, except for Greece and Turkey which are both characterized by slight trade surpluses.

Table 31.Quantities and economic value of exports and imports of fishing products in the Aegean-Levantine Sea

Region	Weight (000 Tonnes)			Value (Million EUR)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Aegean-Levantine Sea	123	402	**-279**	448	662	**-213**
% Mediterranean Sea	16%	19%	21%	21%	11%	6%
Mediterranean Sea	765	2 114	**-1 349**	2 170	5 794	**-3 624**

Adapted from Sacchi et al. (2011) and updated. Adjusted for Mediterranean façades only. Source: FishStat (2013). Values correspond to year 2009 and are originally expressed in US Dollars.**Social Analysis**

- **Employment**

Estimates of the contribution of the fishing activity in the Aegean-Levantine Sea to employment show similar results than the Ionian Sea and Central Mediterranean. Total employment in the Aegean-Levantine sea amounts to 55 000 jobs (Table 32), which represents also a quarter of total direct employments of fisheries in the Mediterranean Sea region (Sacchi, 2011).

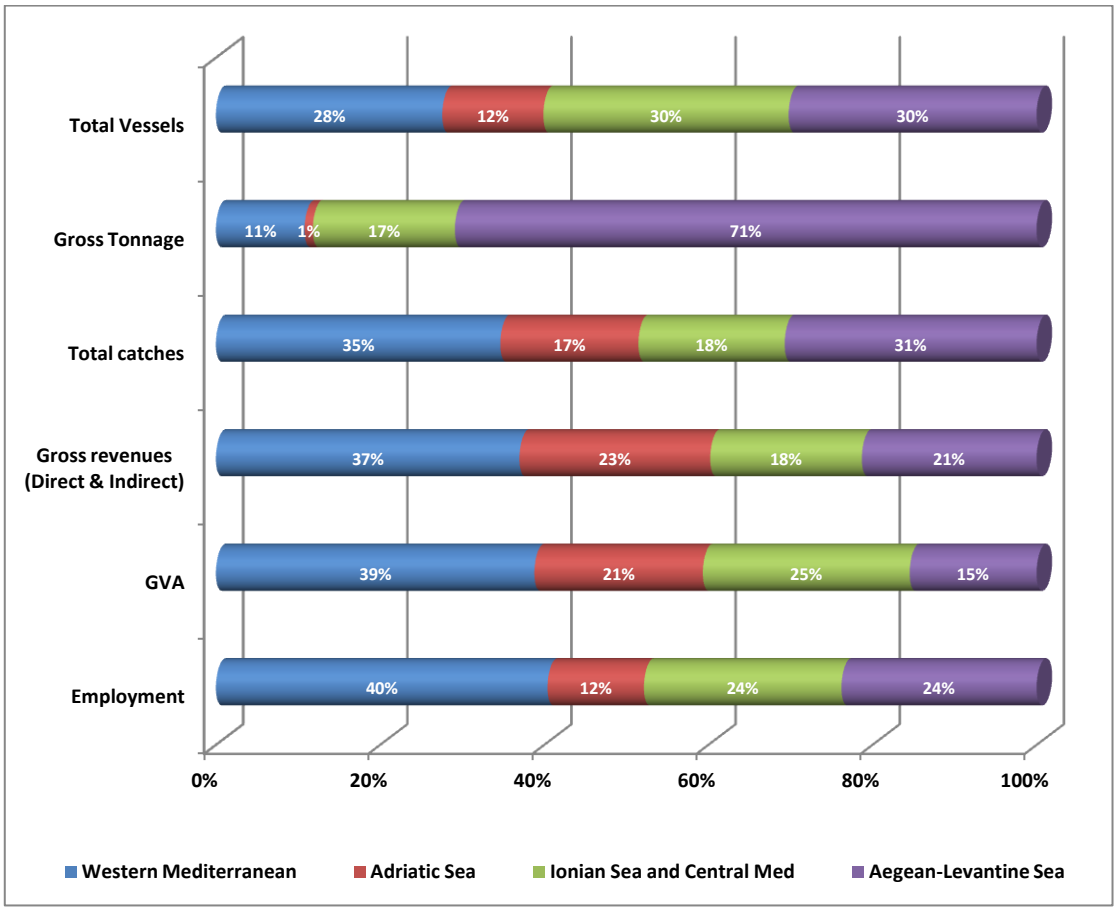
Table 32. Fisheries employment in the primary sector - Aegean-Levantine Sea

Region	Total Employment in the Primary Sector
Aegean-Levantine Sea	**55 250**
% Mediterranean Sea	24%
Mediterranean Sea	**232 420**

Estimated values for year 2008 (Sacchi, 2011).

3.1.5 Overview of fishing activities in the Mediterranean sub-regions

The following figure summarizes main sector, economic and social indicators characterizing the fisheries sector among the different Mediterranean sub-regions considered in the assessment:



This figure shows that the goods provided by the marine ecosystems, here represented by the catches, provide contrasted socioeconomic impacts in the four sub-regions, especially in terms of gross tonnage of the fishing vessels (see the low share of the Adriatic Sea compared to the large one of the Aegean Levantine-Sea), generated gross revenues (see the high share of the Western Mediterranean compared to the small one of the Ionian Sea and Central Mediterranean) or employment (see the high share of the Western Mediterranean compared to the Adriatic Sea).

3.1.6 Perspectives and future trends of fisheries in the Mediterranean Sea

The Mediterranean is one of the world's largest and most ancient fishing grounds. However, and similarly to the rest of the world's seas and oceans, it is being subject to increasingly intense anthropic pressures as the result of technological advancement. Indeed, in the last century, fishing pressure has increased rapidly in the Mediterranean Sea, changing from a primarily artisanal and coastal activity into an intensive exploitation. The semi-industrial fleet size rose regularly in most areas of the Mediterranean in the 70s and 80s. Its fishing capacity tends to increase dramatically with a general growth of vessel's power and technological equipment (Lleonart and Maynou, 2003). Vessels are catching more fish than can be safely reproduced, thus exhausting individual fish stocks and threatening marine ecosystems. Today, the fishing industry is experiencing smaller catches and facing an uncertain future.

As a result, since the early nineties the Mediterranean Sea has seen declining fishing catches. Only since 2007, an average reduction of 15% has been registered (FAO, 2012). In contrast, fish demand in the Mediterranean has experienced a constant growing trend, which has created a deficit between imports and exports that amounted to 3.5 billion Euros in 2009.

As noted in previous sections, today the Mediterranean fleet registers around 73 000 vessels. This number may increase with the development of fishing activities in the southern Mediterranean countries (Lleonart and Maynou, 2003). However, the current fishing capacity in the Mediterranean has been

broadly estimated to be several times greater than what would be needed to land the quantity of fish that would maximize the potential economic rent. According to a study conducted by Plan Bleu, in order to shift the fishing industry to a more sustainable scenario and to maximize sustainable economic rent, fishing capacity would need to be trimmed significantly. Without considering differences in fishing capacity by vessel type, the Mediterranean fishing capacity may need to be reduced by some 50%, meaning that the total fishing fleet may need to be reduced by up to 35 000 – 40 000 vessels. Likewise, it has also been estimated that, in a sustainable scenario, only half of the current employment would be needed (Sauzade and Rousset, 2013). However it should be pointed out that any reform in this respect would need to carefully analyse the Mediterranean fishing picture and consider the socioeconomic importance of the artisanal fleet for coastal communities, versus the semi-industrial and industrial fleets and their activities, which may need to be more strictly managed.

The scientific consensus regarding overfishing is that if the problem is not solved in the coming years, several Mediterranean stocks will suffer a critical collapse. This entails consequences ranging from the socioeconomic impact of declining catches on trade and the livelihoods of coastal communities (with the subsequent increase in the dependence on imported seafood); to the environmental costs of an impoverished marine biodiversity and the alteration of the marine trophic web. The process is already evident as for the well-documented proliferation of autotrophic organisms and jellyfish and it could be further enhanced by the increasing penetration of invasive species (human-induced as well as coming from the Red Sea).

The urgency of the situation has led to the establishment of regulations in the Mediterranean and adjacent seas regarding mesh sizes in order to limit juvenile captures, mainly in the EU context through the establishment of a Common Integrated Fisheries Policy. Furthermore, the GFCM pursues considerable efforts to regulate the fisheries sector by 1) promoting the development, conservation and management of living marine resources; 2) formulating and recommending conservation measures; and 3) promoting cooperation projects. In this sense, the EC also warns that too many fleets are dependent on overfished stocks with respect to maximum sustainable yields, what constitutes one of the core objectives of the reformed Common Fisheries Policy (CFP) which will be implemented in the coming years. Nevertheless, external factors such as global warming add considerable uncertainty to fisheries management (Ciheam, 2010).

3.1.7 Environmental pressures caused by the fishing sector

Fisheries are related to a wide variety of environmental pressures and impacts; however, these depend on several factors, such as the fishing type and gear used, the intensity of fishing and the ecosystem subject to fishing. In addition, they might be associated to targeted fisheries, but also to by-catches and discards. A comprehensive compilation of pressures and impacts of Mediterranean fishing activities is presented in Table 33, based on Tudela (2004), and linked to the EOs established by the MAP's EcAp initiative.

Overexploitation of fishing resources appears as the most important pressure in the Mediterranean Sea. In addition, pollution, global warming and fishing progressively in deeper waters are among the factors that most contribute to jeopardising marine resources and compromise their sustainability (Ciheam, 2010).

Fisheries in the Mediterranean Sea entail effects on its biological diversity. Concerning fishing gears, bottom trawling and longlining have been recognized to cause the highest impacts on marine ecosystems in the whole Mediterranean region. High levels of by-catches –notably from longlining and driftnetting- increase significantly the mortality of many other species (i.e. fish, marine mammals, turtles and seabirds). Indirect effects of fishing on seabirds related to food availability, driven by discards, are also particularly important. These species are also actively or passively damaged by fishing gears.

Fishing gears and vessels may also act as vectors of NIS introduction, altering habitats and processes and causing disease.

Overexploiting fisheries –as stated above, one of the main issues of concern in the Mediterranean- alter natural dynamics of commercial stocks and contribute to habitat damaging. It has been estimated that most Mediterranean stocks are outside safe biological limits (up to 80% of exploited stocks according to EEA), while their long-term viability remains unknown. Unsustainable catch rates of rays (including the disappearance of certain taxa from commercial catches) and other demersal species deserves special concern. Fishing on juveniles and damaging and disturbance of other species belonging to higher trophic levels also entails the alteration of Mediterranean food webs.

Benthic trawling alters benthic habitats, modifies and destroys the structure of seagrass meadows (particularly important for endemic *Posidonia oceanica* beds) and their associated faunal assemblages, and reduces the number of species and the area of suitable habitat. In addition to physical damage, trawling impacts also include excessive suspended sediments. The overall result is the reduced complexity and destruction of the seafloor structure.

Marine litter issued both from fishing vessels and lost or abandoned gears is also a major problem causing entanglement or ingestion by seabirds, turtles, marine mammals and others. Oil releases from vessels along with noise from sonar and vessel engines might cause stress on fish and marine mammals, and may alter and condition the species distribution.

Table 33. Environmental impacts of fisheries in the Mediterranean Sea

Impacts have been aggregated according to EcAp's Ecological Objectives. Adapted from Tudela, 2004

EOs - ECOLOGICAL OBJECTIVE		DESCRIPTION OF IMPACTS		
		Fishing activity	***By-catches***	***Discards***
EO1	Biological diversity	Nursery areas affected. Mortality of seabirds, monk seals and cetaceans due to food scarcity (food supplies affected by overfishing and depletion of food populations). Deliberate killing of monk seals and cetaceans by fishermen to eliminate competition or as bait for fishing gears. Damage to species by entanglement in fishing gears: - Seabird species - Sea turtles - Monk seals - Entanglement and incidental catches of cetaceans. Occasional illegal dynamite fishing originates killing of monk species and inhibits normal trophic behaviour of cetacean species. Attraction of predator species (pelagic fishes and cetaceans) by lights, at night.	Demersal and pelagic fisheries capturing non targeted species (pelagic and demersal). Accidental seabird captures in fisheries. Massive incidental catches of marine turtles. Incidental catches of cetaceans.	
EO2	Non-indigenous species	The use of fishing gears represents a vector for NIS in localised areas		
EO3	Commercial exploited fish and shellfish	Severe decline of overexploited fish populations, unsustainable catches of rays including disappearance of certain taxa. Reduction of commercial species diversity. Decline of fish abundances.	Fishing on juveniles affecting population dynamics, future fish cohorts.	Juvenile fractions suffering the most, since they are often catched and discarded. Finning.
EO4	Food webs	Mortality of seabirds, monk seals and cetaceans due to food scarcity (food supplies affected by overfishing and depletion of food populations). Deliberate killing of monk seals and cetaceans by fishermen to eliminate competition or as bait for fishing gears.		Feeding on discards changes seabird trophic habits.
EO6	Sea–floor integrity	Bottom trawling generates local-mechanical impacts directly on vegetal, coralligenous surfaces, muddy, sandy or rocky habitats and communities and via direct destruction of physical support. Dynamite fishing- all ecosystem components, pelagic and demersal. Changes in demersal biological communities/ Trophic web/ Ecosystem structure and function (trawling, bottom-otter trawling).		
EO7	Hydrographic conditions	Sediment resuspension		
EO9	Contaminants	Vessel oil releases		
EO10	Marine Litter	Litter: " ghost networks ", fishing nets discharged, abandoned or lost at sea/ "domestic" litter from fishermen		
EO11	Noise	Underwater noise generated by fishing boat engines		

3.1.8 Data gap analysis

In recent years, increasing efforts have been undertaken to improve the availability of data collection: since 1970 FAO has provided online databases for production statistics by year, area, sub-area and species; in addition, GFCM elaborates regularly updated bulletins on the Mediterranean and Black Seas fishing fleets, by Geographical Sub-Areas.

However, statistical information on fisheries is generally deficient for several reasons. Capture operations are often highly dispersed, making collection of comprehensive information challenging, particularly for small-scale fisheries. Thus, official statistics for commercial catches are to be taken with care, since they are usually underestimates of real catches because underreporting is widespread (Lleonart and Maynou, 2003), together with unregulated and illegal fishing. In some cases, official data are suspected to represent not more than a third of the reality. This situation is directly linked to the fact that an important part of the Mediterranean production often eludes from circuits allowing data gathering (auctions, markets, etc). In several countries improvements and suggestions to improve the quality of data have been made, but the majority of the statistical information is often still far from reflecting the reality (Papaconstantinou and Farrugio, 2000).

As a result, there is currently a lack of updated fishery databases offering adequate coverage and reliability, in particular in items related to socioeconomic aspects (value of landings by species, revenues, gross value added, and profits). The variety of species and products, and the differences in methods of counting or measuring production (e.g. shell on/off, gutted, whole, dried, or salted) at point of harvest or first sale also present major technical problems. Studies on the socioeconomics of fishing activities in the Mediterranean are developing, in particular focusing on case study areas, but had traditionally been scarce. An improvement in available socioeconomic statistics is needed.

According to the analysis conducted, data is often only available at national levels making difficult to assess specific marine or coastal regions. For the countries concerned, distinguishing between maritime façades belonging to different Mediterranean sub-regions and assessing the impacts of fisheries for each of these façades has been done by means of assumptions and use of approximate ratios.

3.2 AQUACULTURE IN THE MEDITERRANEAN SEA

3.2.1 Introduction

General context

The origin of aquaculture in the Mediterranean Sea region dates back millennia. The beginning of the modern marine aquaculture, however, started during the 1970s. Following world trends, the aquaculture sector has been developing rapidly in the countries surrounding the Mediterranean Sea. From 1997 to 2007, the Mediterranean aquaculture sector registered a growth rate of 70%, in parallel to a declining trend in the capture fishing sector. In addition, total demand for fisheries products in the region has been rising since the 1960s together with the population growth and the increasing human consumption of seafood (Ciheam, 2010).

Traditionally, the Mediterranean aquaculture used to produce mostly mollusc species (62% in 1992), but the share of fish production has been on the increase in the last decade (from 37% in 1992 to 53% in 2001), as has happened worldwide (Lovatelli and Basurco, 2003). In Mediterranean EU countries, a considerable volume of molluscs and shellfish are still produced. However, large research efforts on induced spawning and growing methods of several finfish species allowed production to develop on high value, high demand species such as turbot, gilthead seabream and European seabass, which have provided the big 'boost' of the industry in the Mediterranean over the last two decades (GFCM, 2010).

Activity description

As defined by the EC, aquaculture activities concern the rearing of aquatic organisms, finfish, shellfish or seaweeds, using techniques designed to increase the production of these organisms beyond the natural capacity of the environment. Mariculture is a more specific term widely used for the farming of marine organisms in their natural habitats. The aquaculture term refers to the cultivation of both marine and freshwater species and can range from land-based to open-ocean production. Progress in technology and management over the last decades has made this sector a major contributor to food supply at the global scale.

In the Mediterranean region, the aquaculture sector considered in the present analysis concerns marine and brackish species, including fish, mollusc and crustacean species. Production can be located in diverse environments: artificial bodies such as ponds and reservoirs, lagoons located near the coastline or marine waters.

3.2.2 Methods, data and assumptions

The analysis focuses on the Mediterranean Sea region, and specifically on its sub-regions: Western Mediterranean, Adriatic Sea, Ionian Sea and Central Mediterranean, and Aegean-Levantine Sea.

Sector analysis

The following analysis concerns aquaculture in coastal and offshore areas as well as brackish water culture in areas closely linked to the sea. In addition, data regarding all aquaculture activities in Mediterranean countries (including freshwater, land-based aquaculture and activities located in maritime façades other than the Mediterranean) are also presented at the regional level to bring a global picture of the total magnitude of the aquaculture sector in the region.

Statistical information related to aquaculture activities and production in the Mediterranean countries is available in the FAO Country Profiles (FAO CP), FAO National Aquaculture Sector Overview (FAO NASO) and FAO-FishStat Database (2013). The latter provides the most reliable information regarding aquaculture production by country and large marine basin, as well as by culture environment (freshwater, brackish or marine). Annual data are available from 1950 to 2011.

In the present report, data has been collated from the FAO-FishStat Database using selection criteria that include "total" and "marine and brackish" species cultured in the "Mediterranean and Black Sea" basin. Mediterranean aquaculture is in this manner distinguished from other maritime facades production in most of the cases (Egypt, France, Morocco and Spain) with the exception of Turkey[10]. Thus, data on total national aquaculture production has been taken into account for Turkey. However, according to Candan et al. (2007), 92% of total Turkish marine aquaculture production takes place in the Aegean Sea, whereas the remaining 8% is distributed in Mediterranean and Black Sea waters. Therefore, the presented results are believed to be close to real Turkish activity in the Mediterranean. Regarding the Egyptian production, its huge brackish water production is classified as "inland" but has however been taken into account in the present analysis since most of the activity occurs in the Nile Delta and concern partly brackish species.

The FAO-FishStat Database also provides data on quantities of exported and imported fish per country, in tons, from 1950 until 2011.

For the sub-regional assessment of aquaculture activities, sub-regional estimates have been calculated by means of approximate ratios (according to the coastal length of each maritime façade, for Italy and

[10] The so-called "Mediterranean and Black Sea" FishStat fishing area allows no distinction between production data in Mediterranean Sea and the Black Sea façades. In this study, among all the considered countries, only Turkey presents maritime façades both in the Mediterranean and Black Seas.

Tunisia, or to information contained in the IAs submitted to the EC, for Greece) in order to characterise uniquely the desired Mediterranean sub-regional façade.

Socioeconomic analysis

Aquaculture production in monetary values is available in the FAO FishStat Database. In contrast to fisheries data, the economic value related to total aquaculture produce is also provided from 1950 to 2011 for each country, in US Dollars, and allowing distinguishing the Mediterranean and Black Sea from other maritime façades (Atlantic Ocean or Red Sea)- ..

As for fisheries, the economic contribution of aquaculture activities to national GDPs is generally not available in isolation but aggregated in the statistics of the agriculture sector. FAO CPs and FAO NASO factsheets present country data on production and indicators of economic performance yet the information is also rather old and outdated.

No specific GVA statistics have been found for the aquaculture sector. Therefore, the UN Data-based coefficients calculated to estimate GVA based on fisheries production value (see section 3.1) have been also used to estimate GVA from the aquaculture production value. For countries with no data reported, a ratio based on regional averages has been used.

Regarding employment statistics, information varies from country to country. In some cases, national information regarding the fisheries and aquaculture sectors is recent and exhaustive, such as for Spain. However, in other countries, data publicly available is scarce. As for fisheries, aquaculture activities provide different types of employment: full-time, part-time, and seasonal in the first sector (production) as well as in the second sector (meal production, processing, manufacture, etc.) or even in the tertiary sector (logistic chain and technical and administrative support). As for the fisheries sector, statistics on the contribution to employment has been obtained from the Plan Bleu study (Sacchi, 2011), which provides some estimates of social impacts of aquaculture activities in terms of employment, both in the primary, secondary and tertiary sectors.

As for the sector analysis, to carry out the sub-regional assessment, sub-regional estimates have also been calculated by means of approximate ratios (according to the coastal lengths for Italy and Tunisia, or to information contained in the IAs submitted to the EC for Greece) in order to characterise uniquely the desired Mediterranean sub-regional façade. Data and calculations are presented in Appendix 2.

3.2.3 Sector and socioeconomic analysis for the Mediterranean regional area

Sector Analysis

As in many parts of the world, the aquaculture production in the Mediterranean has been expanding rapidly over recent years. The global share of aquaculture out of the total fisheries production has grown from 4% in 1980 to about 13% in 2000. In the Mediterranean, the share is much higher, and the sector currently accounts for more than 50% of the total fisheries output. Two thirds of the Mediterranean production is based on fish farming and the remaining 33% on mollusc farming (Ciheam, 2010). For some species such as mussels, clams, oysters, seabream, seabass, trout, tilapias, and carps, the majority of the production comes almost entirely from aquaculture.

Taking into account all types of species –freshwater, brackish and marine-, all environments –marine and inland waters- and maritime façades, the total aquaculture production of the Mediterranean countries reaches almost 1.7 million tons in 2011, which represent 2% of the world aquaculture production (>80 million tons) (Table 34). Marine and brackish production in Mediterranean waters totals 1.2 million tons, which represent 3% of world's marine and brackish production and almost 75% of the total Mediterranean one.

In the Mediterranean region, the aquaculture production is mainly concentrated in six countries: Egypt, France, Greece Italy, Spain and Turkey, which jointly supply 95% of the total production in the region.

All of them are characterized by a large, organized aquaculture industry (GFCM, 2010). Whilst in Spain, France and Italy the production is based on intensive farming, mainly of molluscs (mussels, oysters, and clams), in Egypt the production is based on the semi-intensive production of freshwater (mainly tilapia and carp) and marine finfish species (mullet). Greece and Turkey concentrate primarily on the intensive production of selected finfish (seabream, seabass and trout).

Table 34. Aquaculture production in the Mediterranean region

Region	Total Aquaculture Production All species and façades* (A)		Aquaculture Production Marine and brackish waters Only Mediterranean façades** (B)		Production of Med marine and brackish sp. / Total Regional Production
	000 Tons	% World	000 Tons	% World	% (B/A)
Mediterranean Sea	**1 665**	**2%**	**1 237**	**3%**	**74%**
World	**83 729**		**44 734**		53%

Data has been extracted from FAO-FishStat, and corresponds to year 2011. Some of the country values used are FAO estimations.
*Total aquaculture production refers to the total freshwater, brackish and marine species production in all maritime façades of Mediterranean countries, including non-Mediterranean.
**Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.

The remaining Mediterranean countries, except for Israel -with a well-developed sector-, are characterized by marginal or stagnating aquaculture productions (Algeria, Morocco or Tunisia). In some cases, marine aquaculture has little or has not been developed, such as for Lebanon, Libya and Syria.

Economic analysis

Total aquaculture production in Mediterranean countries (all species, environments and maritime façades, including non-Mediterranean) has generated in 2011 more than 3.5 billion Euros, which represents 4% of the sector revenues at the global scale (Table 35). Marine and brackish production in Mediterranean waters have risen a production value of 2.5 billion Euros, which represent 6% of the world revenues of marine and brackish production, and over 70% of the total Mediterranean one.

Table 35. Production value of aquaculture in the Mediterranean region

Region	Production Value All species and façades* (A)		Production Value Marine and brackish sp. Mediterranean façades**(B)		Marine & brackish / Total regional Aquaculture
	Million EUR	% Total World	Million EUR	% Total World	% (B/A)
Mediterranean Sea	**3 559**	4%	**2 561**	6%	72%
World	**97 764**		**44 026**		45%

Data has been extracted from FAO-FishStat and corresponds to year 2011. Some of the country values used are FAO estimations.
*Total aquaculture refers to the production value of total freshwater, brackish and marine species in all maritime façades of the Mediterranean countries, including non-Mediterranean marine environments.
**Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.

In addition, marine and brackish aquaculture production generated a GVA of 1.9 billion Euros (Table 36).

Table 36. Production value and GVA of marine and brackish aquaculture production in the Mediterranean region

Region	Production Value (EUR Million) Marine & brackish sp.	GVA* (EUR Million) Marine & brackish sp.
Mediterranean Sea	**2 561**	**1 870**

Data has been extracted from FAO-FishStat and corresponds to year 2011. Some of the country values used are FAO estimations.
*Ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, ratio derived from similar countries.

Social analysis

The direct contribution of the aquaculture sector to employment in countries belonging to the Mediterranean region amounted to more than 120 000 jobs in 2008. In addition, indirect employment created by the Mediterranean fisheries and aquaculture sectors together has been estimated to be several times higher, over 750 000 jobs. Indirect employment includes the processing industry, the logistics sector and other activities upper in the wider economy (Sacchi, 2011).

Table 37. Contribution to employment of the aquaculture sector in the Mediterranean region

Region	Primary Employment Aquaculture	Indirect Employment Fishing & Aquaculture
	Number of jobs	Number of jobs
Mediterranean Sea	**122 820**	**765 900**

Sacchi (2011). Data refers to year 2008.

3.2.4 Sector and socioeconomic analysis for the Mediterranean sub-regional areas

Western Mediterranean

The Western Mediterranean sub-region includes the following countries: Algeria, France, western Italy, Morocco, and Spain.

Sector Analysis

Total marine and brackish aquaculture production in the Western Mediterranean totals 130 000 tons in 2011, which represents 10% of the production in the Mediterranean basin (Table 38).

Table 38. Aquaculture production in the Western Mediterranean

Region	Aquaculture Production Marine & brackish waters sp. Mediterranean façades	
	1000 Tons	% Total Med
Western Mediterranean	**129**	10%
Mediterranean Sea	**1 237**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the country values used are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.

In this sub-region, the highest production comes from Italy, Spain and France, where the aquaculture industry is varied and well-developed. The main marine species produced in terms of volume are the blue mussel together with finfishes (e.g. gilthead seabream and European seabass), although a number of other species is being successfully cultured on a commercial basis. According to GFCM, the blue mussel's production has stagnated while finfish production is on the increase for long: a noteworthy example is Spain, which is now the third most important producer of European seabass and gilthead seabream in Europe (after Greece and Turkey). In the Spanish case, freshwater aquaculture production

has been declining steadily over the past few years while marine aquaculture has shown a constant upwards trend, with an average annual growth of 16% in the period from 2003 to 2007.

Italy is the first aquaculture producer in Europe and presents a solid aquaculture sector dominated by shellfish production, which constitutes the largest aquaculture segment ahead of the freshwater and marine fish production. Shellfish production remained relatively stable during the last years, but its economic importance kept increasing and doubled during the 1997-2007 period. The marine fish segment started relatively late (late 80s) and still records low production rates, but there has been a considerable private investment in technology both for land-based plants and sea cages (GFCM, 2010).

France is the second larger European aquaculture producer, and specialised in shellfish and finfish production. However, the share of marine aquaculture out of the total national production is low, and approaches a modest 15% according to FAO-FishStat. In addition, in its Mediterranean side, marine production has stagnated due to the lack of availability of new suitable sites (GFCM, 2010). Its Mediterranean production amounted in 2011 to circa 23 000 tons, composed of shellfish and marine fish.

Economic analysis

Table 39. Production value and gross value added of aquaculture in the Western Mediterranean

Region	Production Value Marine & brackish sp.		Gross Value Added Marine & brackish sp.	
	Million EUR	% Total Med	Million EUR	% Total Med
Western Mediterranean	**358**	14%	**242**	13%
Mediterranean Region	**2 561**		**1 870**	

Data has been extracted from FAO-FishStat and refers to year 2011. Some of the values are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.
GVA estimated from a ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, derived from similar countries.

Marine and brackish aquaculture in the Western Mediterranean generated gross revenues of 350 million Euros in 2011, 14% of the regional value for marine and brackish aquaculture. GVA, in turn, accounts for circa 250 million Euros, 13% of the regional GVA.

Social analysis

The direct contribution to employment of the aquaculture sector in the Western Mediterranean reaches 10 000 jobs, around 10% of the regional figure. The number of indirect and induced jobs created by fisheries and aquaculture sectors in the Western Mediterranean basin has been estimated to be close to 150 000 jobs and accounts for a significant 19% of the total employment generated by both sectors at the regional scale.

Table 40. Contribution to employment of the aquaculture sector in the Western Mediterranean

Region	Primary Employment Aquaculture		Indirect Employment Fishing & Aquaculture	
	Number of jobs	%	Number of jobs	%
Western Mediterranean	**10 143**	8%	**147 129**	19%
Mediterranean Sea	**122 820**		**765 900**	

Sacchi (2011). Data refers to year 2008.

Adriatic Sea

The Adriatic Sea sub-region includes the following countries: Albania, Bosnia and Herzegovina, Croatia, eastern Italy, Montenegro and Slovenia.

Sector Analysis

Marine and brackish aquaculture production in the Adriatic Sea amounts to 31 000 tons and accounts for a discreet 3% of the total Mediterranean production.

The Italian production, well-developed and organized as previously detailed, presents the largest contribution to the Adriatic Sea marine and brackish production (70%). Several countries, i.e. Albania and, particularly, Croatia (21% of the Adriatic Sea production) show promising aquaculture sectors with high potential for developing in the coming years. The Albanian marine culture started in the mid-1990s with shrimp, European seabass and gilthead seabream. Its production constitutes 5% of the sub-regional figure in 2011, and its further development will be conditioned by the need to overcome sanitary and quality issues (GFCM, 2010). On the other hand, Bosnia and Herzegovina, Montenegro and Slovenia present marginal aquaculture productions in 2011 (close to 1% in all cases, according to FAO-FishStat) although in the case of Montenegro, the only sector that has shown some growth in recent years is the European seabass and gilthead seabream production. In this case, the development of the sector will depend on the investments in technology and know-how (GFCM, 2010).

Table 41. Aquaculture production in the Adriatic Sea

Region	Production of marine & brackish waters sp.	
	000 Tons	% Total Med
Adriatic Sea	**31**	3%
Mediterranean Sea	**1 237**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the country values used are FAO estimations.

Economic analysis

The economic impacts of marine and brackish aquaculture in the Adriatic Sea reach 90 million Euros in terms of production value, which represents 3% of the marine and brackish aquaculture value in the Mediterranean basin. Similarly, the gross value added generated by the sector in this sub-region amounts to 50 million Euros, also 3% of the regional value.

Table 42. Production value of aquaculture in the Adriatic Sea

Region	Production Value Marine & brackish sp.		Gross Value Added Marine & brackish sp.	
	Million EUR	% Total Med	Million EUR	% Total Med
Adriatic Sea	**88**	3%	**49**	3%
Mediterranean Region	**2 561**		**1 870**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the values are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.
GVA estimated from a ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, derived from similar countries.

Social analysis

Direct contribution to employment of the aquaculture sector in the Adriatic Sea sub-region totals 6 000 jobs, which accounts for a low 5% of the total Mediterranean figures. In contrast, the number of indirect and induced jobs created by both the fisheries and the aquaculture sectors in the Adriatic Sea has been estimated to be over 250 000 jobs, a large figure which represents 35% of the total indirect employment generated by both sectors at the Mediterranean scale, which highlights the development and magnitude of the secondary and tertiary sectors linked to seafood in this sub-region.

Table 43. Contribution to employment of the aquaculture sector in the Adriatic Sea

Region	Primary Employment	Indirect Employment

	Aquaculture		Fishing & Aquaculture	
	Number of jobs	%	Number of jobs	%
Adriatic Sea	**6 046**	5%	**262 777**	34%
Mediterranean Sea	**122 800**		**765 900**	

Sacchi (2011). Data refers to year 2008.

Ionian Sea and Central Mediterranean

The Ionian Sea and Central Mediterranean sub-region includes for study southern Italy, Libya, Malta, Tunisia and western Greece.

Sector Analysis

Marine and brackish aquaculture production in the Ionian Sea and Central Mediterranean sub-region amounts to 100 000 tons, which, compared to the Mediterranean figures, make close to 10% of the regional marine and brackish production and approach the Western Mediterranean values. It is of note that marine and brackish species make up the bulk of the total aquaculture production in the sub-region, and represent over 90% of the aquaculture species cultivated in the sub-region.

Table 44. Aquaculture production in the Ionian Sea and Central Mediterranean

Region	Production marine & brackish waters sp.	
	000 Tons	% Total Med
Ionian Sea and Central Mediterranean	**96**	8%
Mediterranean Sea	**1 237**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the country values used are FAO estimations.

Western Greek (over 70%) and south Italian aquaculture (circa 20%) constitute the bulk of the production in the Ionian Sea and Central Mediterranean. Their high share contrasts with Libya's negligible production resulting from an underdeveloped aquaculture sector and with the (still) small aquaculture industry in Tunisia, in spite of its high potential (Ciheam, 2010).

Economic analysis

Table 45. Production value of aquaculture in the Ionian Sea and Central Mediterranean

Region	Production Value Marine & brackish sp.		Gross Value Added Marine & brackish sp.	
	Million EUR	% Total Med	Million EUR	% Total Med
Ionian Sea and Central Med	**346**	14%	**233**	12%
Mediterranean Region	**2 561**		**1 870**	

Data has been extracted from FAO-FishStat, and corresponds to year 2011. Some of the values are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.
GVA estimated from a ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, derived from similar countries.

As for the Western Mediterranean, the economic value generated by the production of marine and brackish species in the Ionian Sea and Central Mediterranean totals circa 350 million Euros, 14% of the Mediterranean values. Regarding GVA, values reach 230 million Euros, 12% of Mediterranean numbers.

Social analysis

The direct contribution to employment of the aquaculture sector in the Ionian Sea and Central Mediterranean sub-region totals more than 8 000 jobs which account for 7% of the total Mediterranean figures. In contrast, the number of indirect and induced jobs created by the fisheries and aquaculture sectors has been estimated to be over 100 000 jobs, a large figure which represents 14% of indirect employment generated by both sectors at the regional scale.

Table 46. Contribution to employment of the aquaculture sector in the Ionian Sea and Central Mediterranean

Region	Primary Employment Aquaculture		Indirect Employment Fishing & Aquaculture	
	Number of jobs	%	Number of jobs	%
Ionian Sea and Central Med	**8 041**	7%	**109 624**	14%
Mediterranean Sea	**122 820**		**765 900**	-

Sacchi (2011). Data correspond to year 2008.

Aegean-Levantine Sea

The Aegean-Levantine Sea sub-region involves the following countries: Cyprus, Egypt, Greece (except for its western coasts), Israel, Lebanon, Palestine, Syria and Turkey.

Sector Analysis

Production of marine and brackish species in the Aegean-Levantine Sea accounts for 80% of total Mediterranean production. It amounts to almost one million tons and is, by far, the most important aquaculture production among Mediterranean sub-regions. These high numbers are mainly consequence of the contribution of the extensive Egyptian aquaculture to the sub-regional production. In addition, Greece and Turkey also register intense aquaculture activities along their Mediterranean coasts.

Table 47. Aquaculture production in the Aegean-Levantine Sea

Region	Aquaculture Production Marine & brackish waters sp. Mediterranean façades	
	000 Tons	% Total Med
Aegean-Levantine Sea	**980**	79%
Mediterranean Sea	**1 237**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the country values used are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.

Egypt is the country where aquaculture is being most developed, both in brackish and freshwater environments, with the objective to meet the diet requirements of a growing population. Production is very high, since there is an intense aquaculture activity in the area of the Nile delta.

In Greece, the industry has undoubtedly benefited from the natural advantages of its geography, a long coastline with many sheltered bays, favourable climatic conditions as well as national and EU subsidies for investment in production infrastructure. Greece is by far the largest producing country for European seabass and gilthead seabream in the Mediterranean (GFCM, 2010).

Turkey is the second largest producer of European seabass and gilthead seabream in the Mediterranean countries. Marine aquaculture started late (mid 80s) and the aquaculture sector as a whole developed mainly in the 1990s with the production of European seabass and gilthead seabream in the Mediterranean and mussels in the northern Aegean. The rapid growth of the sector in Turkey was driven by a growing demand for fish, the availability of sheltered sites and good water quality, government subsidies, relatively flexible regulations for licensing, high private sector interest and low labour cost. Even with a relatively low annual domestic consumption of fish per capita (8.19kg), its population size along with its high annual growth rate of income per capita explains the large and growing domestic market for seafood products. As in other Mediterranean countries, the future of the Turkish aquaculture sector is conditioned by the competition between coastal activities for space in favourable areas for aquaculture (GFCM 2010). At present, the Turkish marine aquaculture production takes place mainly in its Aegean and Mediterranean coasts (more than 92%) while production in the Black Sea is marginal (Canan et al., 2007).

Economic analysis

Production value of marine and brackish aquaculture in the Aegean-Levantine Sea reaches 1 800 million Euros in 2011, which accounts for the largest share of the aquaculture value in the Mediterranean basin (70%). Similarly, regarding GVA, the sub-region exceeds 1 300 million Euros, which account for more than 70% of the Mediterranean aquaculture GVA.

Table 48. Production value of aquaculture in the Aegean-Levantine Sea

Region	Production Value Marine & brackish sp. Mediterranean façades		Gross Value Added Marine & brackish sp. Mediterranean façades	
	Million EUR	% Total Med	Million EUR	% Total Med
Aegean-Levantine Sea	**1 768**	69%	**1 346**	72%
Mediterranean Region	**2 561**		**1 870**	

Data has been extracted from FAO-FishStat, and refers to year 2011. Some of the values are FAO estimations.
Total marine and brackish species production in Mediterranean façades excludes freshwater production and refers only to aquaculture production in Mediterranean waters.
GVA estimated from a ratio based on UN Data regarding national fisheries and aquaculture, or, when missing, derived from similar countries.

Social analysis

The Aegean-Levantine Sea sub-region also registers the largest direct contribution to employment of the aquaculture sector among Mediterranean sub-regions. Almost 100 000 direct jobs account for 80% of total Mediterranean figures. In contrast, the number of indirect jobs have been estimated to be close to 250 000, which at the regional scale account for 32% of the indirect employment.

Table 49. Contribution to employment of the aquaculture sector in the Aegean-Levantine Sea

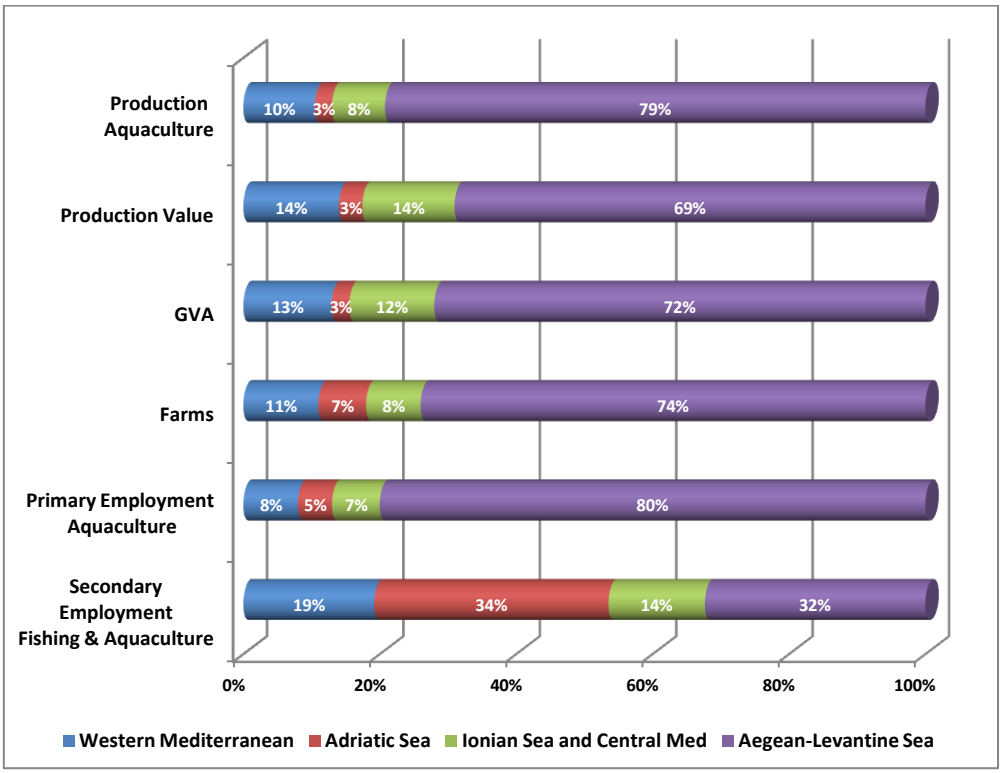
Region	Primary Employment Aquaculture		Indirect Employment Fishing & Aquaculture	
	Number of jobs	%	Number of jobs	%
Aegean-Levantine Sea	**98 590**	80%	**246 370**	32%
Mediterranean Sea	**122 820**		**765 900**	

Sacchi (2011). Data correspond to year 2008.

The Egyptian aquaculture sector provides more than two thirds of the aquaculture total jobs in the sub-region. In Greece, the European seabass and gilthead seabream production sector is estimated to employ close to 10 000 people directly on a full-time basis. In addition, the aquaculture sector in Turkey is estimated to provide (direct and indirect) employment for about 25 000 people (most of them in rural areas) (GFCM, 2010).

3.2.5 Overview of the aquaculture sector in the Mediterranean sub- regions

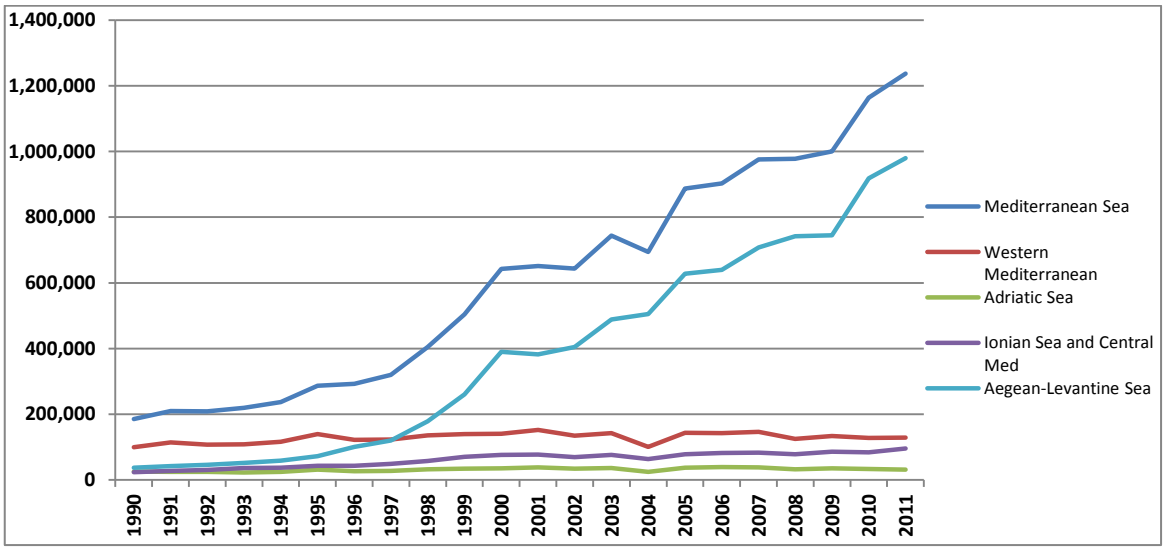
The following figure summarizes main sector, economic and social indicators characterizing the aquaculture sector among the different Mediterranean sub-regions considered in the assessment:



3.2.6 Perspectives and future trends of aquaculture in the Mediterranean region

Aquaculture, and in particular mariculture, is expected to develop widely and diversify in the near future in the Mediterranean's European, Southern and Eastern countries. The decline of wild stocks together with the demand on fish produce, which is also expected to continue increasing, indicate that aquaculture might continue to be one of the most viable methods to supply growing population needs in seafood. Early projections estimate that only the European aquaculture in the Mediterranean Sea could grow more than 100% by 2030, meaning a total production exceeding 600 000 tons, a rise of the sector's total (direct and indirect) value of 5 billion Euros, and the provision 10 000 more direct jobs in the Mediterranean EU MS (Eatip, 2012).

Figure 3. Aquaculture marine and brackish production in the Mediterranean (1990-2011)



Source: FAO-Fishstat.

As pointed out in previous sections, several Mediterranean countries already have large and well-organized aquaculture sectors. In contrast, some others have small aquaculture industries with growth potential for the coming years: Albania, Algeria, Croatia, Israel, Montenegro, Morocco and Tunisia have been listed among them (GFCM, 2010). On the other hand, it has been observed that the total aquaculture production among Mediterranean EU Member States has levelled off except for Greece, as a result of the lack of new suitable areas for mollusc or fish farming due to geographic-environmental issues, competition for coastal space with other users or regulations and governance issues. In this case, opportunities for expansion may be driven by the development and establishment of new and more environmentally friendly production techniques; as well as by the establishment of rearing cages in the open sea (Ciheam, 2010).

Almost all Mediterranean countries register a deficit of fishery products, which is due to the rising population and to the increasing per capita consumption, as well as to the stagnation or even decline of wild fish captures. For this reason, a scenario of increasing prices has been predicted, which derives from the uncertainty as to how aquaculture will develop in many states. The demand on fishing products can also be satisfied through imports (as it is now), and therefore this projected scenario may not necessarily benefit aquaculture producers (Ciheam, 2010).

The challenge to maintain profitability and environmental compatibility is considerable. Aquaculture growth was encouraged initially by governments, eager only for economic success. Nevertheless, many governments have started to implement strict regulatory guidelines addressing environmental and social issues to ensure sustainability. In addition, several hazard risks and derived knowledge gaps still need to be overcome, namely: effects of climate change such as flooding, increases in frequency and intensity of storm events, seawater acidification, increase of sea water temperature and potential derived biological effects on species cultured; control of diseases (existing and new) and of stock losses; and finally, public health issues, ensuring the continuous safety of aquaculture products, identifying, managing and addressing potential negative effects on consumers and consequent market losses.

3.2.7 Environmental pressures of aquaculture activities

As noted previously, aquaculture faces today a significant two-fold challenge: how to fulfil the expectation of alleviating the pressure that fishing fleets exert on fish populations and the increasing demand of sea products in local and international markets without leading to environmental problems. In order to avoid potential environmental disruption issues, it is important that the aquaculture sector is provided with clear, user friendly and scientifically-based guidelines to ensure its sustainable development.

Indeed, the development and intensification of aquaculture has revealed a broad spectrum of associated environmental issues that have been listed in Table 50, according to EcAp Ecological Objectives.

Regarding biodiversity, one of the environmental concerns of aquaculture deals with the biological interaction caused by the unintentional release of farmed organisms. In addition, another major problem regards the introduction of non-indigenous species into the environment, which may cause alterations in the genetic pattern of wild populations. In both cases, cultured organisms may compete with native species for food and space, and might also transfer diseases and parasites. Although bacteria, viruses and other pathogens occur naturally, disease outbreaks are more likely to occur in farmed animals, and bidirectional transfers of pathogens between farmed and wild organisms might take place. These aspects should also be taken into account when considering the relation of aquaculture with other human uses or activities in coastal areas (IUCN, 2007).

Many studies have also implicated overfeeding in fish farms as the cause of changes in the benthic community structure, which may favour some organisms over others. Sedentary or fixed organisms may die in oxygen-depleted waters resulting from microbial decomposition, while mobile populations may migrate to other areas (Emerson, 1999).

Farmed species such as fish and crustaceans are fed diets with high contents of protein and oils, mostly fishmeal and fish oil. Moreover, seed and brood stock are sometimes obtained from wild stocks, due to the difficulty of raising them in captivity (such as for Bluefin tuna), thereby increasing the pressure on wild fish populations.

Effluent discharges from aquaculture facilities pose environmental concerns, as they may contain residues of therapeutic products, antifouling agents or uneaten fish feed. If improperly managed, it can lead to antibiotic pathogen resistance, water eutrophication, oxygen depletion and other problems contributing to environmental damage.

Finally, it is worth noting that since aquaculture takes place in the proximity to coastal fringes, it may affect and entail costs to other socioeconomic sectors also established or seeking places in coastal areas. However, most of the potential environmental impacts of aquaculture can be managed and minimized through the understanding of processes, responsible management and an effective siting of farms. Therefore, sustainable management guides are essential tools for policy makers, administrators, aquaculture producers and other stakeholders (IUCN, 2007).

Table 50. Environmental impacts of the aquaculture sector in the Mediterranean Sea. Impacts have been aggregated according to EcAp's Ecological Objectives

EOs - ECOLOGICAL OBJECTIVES		DESCRIPTION OF IMPACTS
EO1	Biological diversity	Pathogen transfer and effects on local wild marine organisms Therapeutans and antifouling effects on local wild marine organisms Interaction between aquaculture and local fauna and flora Destruction or disturbance of habitats.
EO2	Non-indigenous species	Leakage or escaping leading to the introduction of alien marine species (e.g. fish, crustaceans, molluscs, aquatic plants) Alien parasites and pathogens.
EO3	Commercial species	Capture of wild stocks for aquaculture needs: stock depletion and/or collapse.
EO5	Eutrophication	Organic and inorganic nutrient loss through the effluents.
EO6	Sea-floor	Local benthic impacts such as sediment anoxia, sediment chemical changes or changes in and/or absence of macrofauna Decline and severe effects on *Posidonia oceanica* meadows in contact with effluents at short, mid and long terms.
EO7	Hydrographic conditions	Increase in particulate matter.
EO9	Contaminants	Release of waste products derived from animal metabolism Antibiotic and biocide releases Antifouling biocides.

EOs - ECOLOGICAL OBJECTIVES		DESCRIPTION OF IMPACTS
EO10	Marine litter	Littering, waste discharge.

3.2.8 Data gap analysis

As for fisheries, correct data regarding aquaculture production, gross value added and reliable figures of its contribution to employment in the Mediterranean are hardly available at the regional scale. Official governmental sources, official industrial sources may significantly differ with actual figures. In countries where the production is not significant or the industry is still small, there is often a lack of expertise or no established mechanism for official data collection. It should be noted that the situation in most countries has improved in recent years among large producing countries. However, the GFCM (2010) highlights a particular problem regarding Greek statistical data, especially important as it is a very large producing country where unlicensed and unregulated production is significant in percentage and absolute values.

3.3 TOURISM AND RECREATIONAL ACTIVITIES

3.3.1 Introduction

General Context

The Mediterranean region, including both its northern and southern shores, is the world's leading tourist destination. Tourism in the region is spatially and seasonally concentrated, and it mainly occurs in Mediterranean coastal areas during the summer holiday months.

During the last decades, Mediterranean tourism has been in constant growth. From 58 million international arrivals in 1970, it has grown to 290 million in 2011, which corresponds to an increase of nearly 390% over 40 years (UNWTO, 2013). At present, international arrivals in the Mediterranean region account for one third of the world's international tourism. Therefore, this sector plays a vital role in the region's country economies, representing a significant source of economic growth and employment.

For the past two decades, Southern and Eastern Mediterranean countries (Algeria, Egypt, Israel, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey) have registered the highest growth rates of inbound world tourism, which contrasts with the weaker development of tourism in the northern rim, particularly in EU Member States, during the same period. In this sense, the economic performance of tourism in southern countries is particularly significant on account of political and economic instabilities, which have had no major overall impact on this growth, thus confirming the resilience of tourism and its huge potential of these countries (Lanquar, 2012).

Activity description

Tourism has been defined as a social, cultural and economic phenomenon entailing the movement of people to countries or places outside their usual environment for personal or professional purposes. Tourism has implications on the economy, on the natural and built environment, on the local population at the destination and on the tourists themselves (UNWTO).

In this regard, the concept of tourism and recreational activities has been defined as the cluster of production units in different industries that provide consumption goods and services demanded by visitors (UNWTO). The so-called *tourism industry* includes construction and infrastructure, transportation, accommodation, food and beverage services, recreation and entertainment, travel agencies, tour operators and a large share of handicraft activities, culture and heritage, etc.

Tourism presents a particular spatial pattern: it is a highly fragmented activity and it is located in specific environments and destinations where a variety of environmental, cultural, social and physical attractions exist. It takes into account travel for holidays, recreation and other types of leisure; as well as travel for business and professional purposes, religious voyages and pilgrimages or even travel for health treatments. All types of transport are considered, i.e. air and surface transport, such as road, rail and over water.

3.3.2 Methods, data and assumptions

The following analysis provides details on the Mediterranean tourism and recreational activities sector, as well as on its economic and social characteristics. The analysis focuses on the Mediterranean Sea region, and specifically on its sub-regions: Western Mediterranean, Adriatic Sea, Ionian Sea and Central Mediterranean, and Aegean-Levantine Sea.

Sector analysis

The present study aims at quantifying economic and social impacts of human activities having a direct or close relationship with Mediterranean coastal and marine environments. In this case, tourist indicators concern domestic and international arrivals (national and international tourism), which are available at the national level in the last UNWTO annual compendiums. For both the regional and sub-regional analysis, the proportion of the tourist activity in coastal Mediterranean areas has been calculated by means of

previous Plan Bleu estimations regarding the weight of coastal tourism over total national tourism for each Mediterranean country, based on expert judgement (Plan Bleu, 2005). Coastal areas are defined by Plan Bleu as equivalent to the NUTS 3 level in EU countries (*provinces* in Spain and Italy, *departments* in France, *nomes* in Greece) and to equivalent levels in Eastern and Southern Mediterranean countries (*provinces*, *governorates*, *mohafazat*, etc.). In this sense, a ratio of littoral versus total tourism in the Mediterranean countries, based on 2003 data regarding tourism frequentation, has been applied to estimate the economic and social impacts of tourism and recreational activities in coastal areas, assuming that the national and international share on littoral areas have not varied during the last decade.

In addition, sub-regional estimates have been calculated by means of approximate ratios (according to the coastal length of each maritime façade, for Italy and Tunisia, or to information contained in the IAs submitted to the EC, for Greece) in order to characterise uniquely the considered Mediterranean sub-regional façades.

A table with the detail of the shares of national and international tourism in coastal areas per country can be found in Appendix 2.

Economic and social analysis

The economic and social analysis has been built based on national tourism statistics of Mediterranean countries, which have been obtained from the World Travel and Tourism Council (WTTC). The WTTC produces world and country statistical factsheets that are published annually, gathering the most recent and accurate information on the economic and social data on travel and tourism.

The WTTC factsheets annually provide a synopsis of quantitative data on direct, indirect and induced impacts of tourism and recreational activities on national economies. Tourism indicators published in WTTC factsheets of the Mediterranean countries have been collected. For the purpose of the present analysis, the country indicator "internal tourism consumption" has been considered as a measure of the sector's turnover: indeed, "internal tourism consumption" is defined by the WTTC as "total revenue generated within a country by industries that deal directly with tourists including visitor exports, domestic spending and government individual spending. This does not include spending abroad by residents". Similarly, "direct and total contributions of this sector to Gross Domestic Product" has been considered as a measure of the sector's gross value added. In addition, the WTTC factsheets also publish quantitative data on the direct and total contribution of tourism and recreational activities to employment, at the national level.

As for the sector analysis, the ratio littoral versus total tourism in Mediterranean countries based on 2003 data estimated by Plan Bleu (2005) has also been applied to estimate the economic and social impacts of tourism and recreational activities in Mediterranean coastal areas. Moreover, to develop the sub-regional assessment, estimates have also been calculated by means of approximate ratios (according to coastal lengths or to information contained in the IAs submitted to the EC) in order to characterise uniquely the Mediterranean sub-regional façades

Data and calculations are presented in Appendix 2.

3.3.3 Sector and socioeconomic analysis for the Mediterranean regional area

Sector Analysis

Tourism in Mediterranean coastal areas has been in constant growth for many decades. Its increasing trend was interrupted in 2009 due to the global economic crisis. Nevertheless, at present, pre-crisis levels have been recovered and even exceeded. Over 850 million arrivals have been recorded in 2012 in the region, which make 14% of world tourism figures (Table 51).

International tourist arrivals (defined in statistics as overnight visitors, the most used indicator of the touristic activity) in the Mediterranean region account for nearly 300 million in 2012 according to the

latest available data. This figure represents 30% of total world tourist arrivals, which have exceeded 1 billion marks for the first time ever (UNWTO), in spite of constant economic instabilities around the globe.

In contrast, despite the 550 million national arrivals registered in the Mediterranean basin, these account for a lower share when compared to the global domestic tourism numbers (11%).

Close to half of the total Mediterranean tourism (43%) is concentrated in coastal zones. These register 150 million international arrivals, 50% of the regional international numbers, and more than 200 million national visitors, which represent 40% of the Mediterranean domestic tourism.

Table 51 International and domestic arrivals in the Mediterranean basin in 2012

Region	Coastal Mediterranean Sea (000 arrivals)			All Mediterranean Countries (000 arrivals)		
	International	Domestic	Total	International	Domestic	Total
Mediterranean Sea	**153 355**	**215 178**	**368 533**	**298 562**	**558 731**	**857 293**
% World	15%	4%	6%	29%	11%	14%
World	**1 035 000**	**5 053 000***	**6 088 000**	**1 035 000**	**5 053 000***	**6 088 000**

UNWTO, 2014. Share of international arrivals in Mediterranean coastal areas calculated based on Plan Bleu estimations (Plan Bleu, 2005).
*Calculated from world international tourism, based on UNWTO ratio: domestic tourism makes up 83% of world tourism.

Economic Analysis

In 2012, total revenues of tourism and recreational activities in the Mediterranean countries exceed 500 billion Euros, which represent 12% of total revenues of tourism at the world scale (Table 52). Similarly, tourism in the Mediterranean coastal areas –which reaches 250 billion Euros– also accounts for a significant proportion of global tourist revenues (6%).

The direct GVA of tourism in the Mediterranean countries represents close to 300 billion Euros, approximately 14% of tourist GVA at the world scale. When considering the total GVA (i.e. direct, indirect and induced effects) values exceed 700 billion Euros, around 11 % of GVA in 2012, confirming its key economic importance in the region.

Gross value added for coastal tourism in the Mediterranean almost attains 135 billion Euros, which represents a noteworthy 7% of direct contribution of tourism at the global scale.

Table 52. Turnover, direct and total contribution to GDP of tourism and recreational activities in the Mediterranean basin

Region	Turnover (Million EUR)		GDP Direct Contribution Gross Value Added (Million EUR)		GDP Total Contribution (all façades) (Million EUR)
	Coastal areas	Total	Coastal areas	Total	Total
Mediterranean Sea	**250 786**	522 260	**135 233**	282 580	**729 271**
% World	**6%**	12%	**7%**	14%	**11%**
World		**4 239 300**		**2 056 600**	**6 630 400**

Data extracted from the WTTC country factsheets (2013) referring to the year 2012, except for Bosnia and Herzegovina (data from 2011). Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Social Analysis

It has been observed that the growth in tourism employment is slower than the increase in international tourist arrivals and in domestic tourism (WTTC, 2013). However, direct and indirect employment generated by the tourism and recreational activities sector significantly contribute to overall employment in the Mediterranean countries, including jobs supported directly and indirectly as well as induced by the sector.

Direct and total tourism employment at the world scale amount, respectively, to 100 million jobs and over 250 million jobs (Table 53). Tourism in the Mediterranean coastal areas generates a significant 3% of these, rising to 7% if the total national area of all countries bordering the Mediterranean Sea is considered.

Table 53. Direct and total contribution to employment of tourism and recreational activities in the Mediterranean basin

Region	Direct Contribution of Tourism to Employment (000 jobs)		Total Contribution of Tourism to Employment (000 jobs)	
	Coastal areas	Total	Coastal areas	Total
Mediterranean Sea	**3 297**	7 532	**8 450**	19 063
% World	**3%**	7%	**3%**	7%
World		**101 118**		**261 394**

Data extracted from the WTTC country factsheets (2013) referring to the year 2012, except for Bosnia and Herzegovina (data from 2011). Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

3.3.4 Sector and socioeconomic analysis for the Mediterranean sub-regional areas

Western Mediterranean

The Western Mediterranean basin is surrounded by Algeria, France, western Italy, Morocco, Spain and northern Tunisia.

Sector Analysis

As noted previously, the Western Mediterranean sub-region registers the highest share of the total tourist arrivals in the Mediterranean, with more than 600 million national and international arrivals in 2012 which represent 70% of the Mediterranean overnight visitors. During the last decade, the Western Mediterranean experienced increasing overnight stays except for the year 2009, which recorded a drop as a consequence of the economic and financial crisis. However, levels have recovered and even exceeded 2008 values.

Regarding international visitors, almost 185 million tourists -corresponding to two thirds of the total overnight visitors in the region- are recorded in the Western Mediterranean. The share increases to 75% (over 400 million arrivals) when national tourism is considered.

Out of the total number of tourist arrivals in the sub-region, one third (more than 200 million) is registered in coastal areas (Table 54). Among all Mediterranean sub-regions, the Western Mediterranean shows the highest rates of international (50% of the regional international arrivals) and domestic (65% of the regional national arrivals) tourism in its coastal areas per year.

It should be noted that, among countries bordering the Western Mediterranean basin, Spain on its own accounts for 50% of total international tourist arrivals and 40% of national arrivals in coastal areas of the sub-region.

Table 54. International and domestic arrivals in the Western Mediterranean sub-region in 2012

Region	Coastal Mediterranean Areas (000s)			Total Mediterranean Countries (000s)		
	International	Domestic	Total	International	Domestic	Total
Western Mediterranean	**80 285**	**139 087**	**219 372**	**184 302**	**421 008**	**605 310**
% Mediterranean Sea	52%	65%	**60%**	62%	75%	**71%**
Mediterranean Sea	**153 355**	**215 178**	**368 533**	**298 562**	**558 731**	**857 293**

UNWTO, 2014. International and domestic arrivals in coastal areas have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Economic Analysis

In 2012, total revenues of tourism and recreational activities in the Western Mediterranean account for 350 billion Euros, which represent more than two thirds of total Mediterranean tourism revenues. Tourism in the Western Mediterranean coastal areas generated a turnover of almost 150 billion Euros, more than half the Mediterranean turnover in coastal areas and 28% of total Mediterranean revenues (Table 55).

Similarly, the Gross Value Added of tourism in the Western Mediterranean sub-region accounts for 67% of the total Mediterranean numbers, while GVA in the Western Mediterranean coastal areas accounts for almost 60% of the regional figures. It is worth noting that Spain and Italy are the countries concentrating by far the highest tourism turnover and GVA in the sub-region (75%) and, together with France, they account for 95% of the sub-regional figures.

Table 55. Turnover, direct and total contribution to GDP of the Western Mediterranean sub-region

Region	Turnover (Million EUR)		GDP Direct Contribution Gross Value Added (Million EUR)		GDP Total Contribution (all façades) (Million EUR)
	Coastal areas	Total	Coastal areas	Total	Total
Western Mediterranean	**143 659**	**350 392**	**77 548**	**188 450**	**487 620**
% Mediterranean Sea	57%	67%	57%	67%	67%
Mediterranean Sea	**250 786**	**522 260**	**135 233**	**282 580**	**729 271**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Social Analysis

The tourism sector provides more than 4 million direct jobs in the Western Mediterranean in 2012, which rise up to almost 10 million when indirect and induced employment is also considered. This represents 50% of the Mediterranean regional figures (Table 56).

Tourism in the Western Mediterranean coastal areas also provides 50% of total tourism employment in Mediterranean coastal areas, 1,5 million direct jobs and more than 4 million total (direct, indirect and induced) jobs.

According to sector and economic indicators, Spain and Italy are the countries in the Western Mediterranean sub-region where tourism most contributes to employment (together, 60% of employment in coastal areas). The tourism sector both in Algeria and Morocco's coastal areas generate directly 20% of the sub-region's employment (around 10% each) yet, today, they are still under development.

Table 56. Direct and total contribution to employment of tourism and recreational activities in the Western Mediterranean sub-region

Region	Direct Contribution of Tourism to Employment (000 jobs)		Total Contribution of Tourism to Employment (000 jobs)	
	Coastal areas	Total	Coastal areas	Total
Western Mediterranean	**1 576**	**4 028**	**3 988**	**9 986**
% Mediterranean Sea	48%	53%	47%	52%
Mediterranean Sea	**3 297**	**7 532**	**8 450**	**19 063**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Adriatic Sea

The Adriatic Sea is surrounded by Albania, Bosnia and Herzegovina, Croatia, eastern Italy, Montenegro and Slovenia.

Sector Analysis

The Adriatic Sea hosts a modest 6% of the total regional tourism in the Mediterranean basin. However, the Adriatic Sea has experienced a constant increasing trend during the past decade, not even interrupted by the onset of the economic crisis.

The share of the international tourism amounts to 9% of the international overnight visitors in the Mediterranean basin while only 4% of the regional domestic tourism is recorded in the Adriatic Sea. More than two thirds of the total arrivals to the sub-region (both national and international) occur in coastal areas, which register 12% of the Mediterranean international visitors and 7% of the regional domestic visitors (Table 57).

Among countries belonging to the Adriatic Sea sub-region, Croatia accounts for 55% of total sub-regional international arrivals in coastal areas, and together with Italy they reach a rate of almost 90%. Regarding domestic tourism, Italy accounts on its own for 66% of the sub-regional figures.

Table 57. International and domestic arrivals in the Adriatic Sea sub-region in 2012

Region	Coastal Mediterranean Areas (000s)			Total Mediterranean Countries (000s)		
	International	Domestic	Total	International	Domestic	Total
Adriatic Sea	**17 656**	**15 686**	**33 342**	**26 192**	**25 035**	**51 227**
% Mediterranean Sea	12%	7%	**9%**	9%	4%	**6%**
Mediterranean Sea	**153 355**	**215 178**	**368 533**	**298 562**	**558 731**	**857 293**

UNWTO, 2014. International and domestic arrivals in Mediterranean coastal areas have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Economic Analysis

In 2012, the total revenues of tourism and recreational activities in the Adriatic Sea amount to 40 billion Euros, 7% of total revenues of tourism at the Mediterranean level. Tourism in coastal areas generates a turnover of 26 billion Euros, accounting for 10% of the coastal Mediterranean turnover (Table 58).

Table 58. Turnover, direct and total contribution to GDP in the Adriatic Sea sub-region

Region	Turnover (Million EUR)		GDP Direct Contribution Gross Value Added (Million EUR)		GDP Total Contribution (all façades) (Million EUR)
	Coastal areas	Total	Coastal areas	Total	Total
Adriatic Sea	**25 722**	**38 457**	**12 978**	**19 025**	**49 387**
% Mediterranean Sea	10%	7%	10%	7%	7%
Mediterranean Sea	**250 786**	**522 260**	**135 233**	**282 580**	**729 271**

Data have been extracted from the WTTC country factsheets (2013) referring to year the 2012, except for Bosnia and Herzegovina (data from 2011). Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

The gross value added of total tourism in the Adriatic Sea sub-region also accounts for 7% of the total Mediterranean value. Similarly, regarding coastal tourism, the Adriatic Sea GVA slightly registers higher values and accounts for 10% of the total GVA generated by coastal tourism in the Mediterranean region.

Among the countries of the Adriatic Sea sub-region, the Italian and Croatian coastal tourism activities provide in all cases for the highest revenues as well as direct and total GVA (over 90%).

Social Analysis

More than 450 000 direct jobs are generated by tourism and recreational activities in the Adriatic Sea, rising up to more than 1 million when indirect and induced employment are also considered. These numbers represent a small fraction of the Mediterranean regional figures (6%) as shown in

Table 59.

When considering tourism in coastal areas, the Adriatic Sea shares slightly increases and accounts for circa 10% of total tourism employment in Mediterranean coastal areas.

Table 59. Direct and total contribution to employment of tourism and recreational activities in the Adriatic Sea sub-region

Region	Direct Contribution of Tourism to Employment (000 jobs)		Total Contribution of Tourism to Employment (000 jobs)	
	Coastal areas	Total	Coastal areas	Total
Adriatic Sea	**305**	**466**	**766**	**1 223**
% Mediterranean Sea	9%	6%	9%	6%
Mediterranean Sea	**3 297**	**7 532**	**8 450**	**19 063**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012, except for Bosnia and Herzegovina (data from 2011). Mediterranean coastal shares been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Among the countries considered in the Adriatic Sea sub-region, the Italian tourism provides almost 50% of direct and total tourism jobs in coastal areas.

Ionian Sea and Central Mediterranean

The Ionian Sea and Central Mediterranean basin is surrounded by southern Italy, Libya, Malta, Tunisia as well as eastern Greece.

Sector Analysis

The Ionian Sea and Central Mediterranean shows the lowest levels of tourist arrivals in the Mediterranean region in 2012, both international and domestic: 36 million total overnight visitors are registered in the sub-region. Out of these, 17 million are international, accounting for only 6% of the Mediterranean numbers; and 19.5 million are national, a low 3% of the regional figures.

These shares timidly increase when coastal tourism in the Ionian Sea and Central Mediterranean is analysed, and reach 7-9% of the regional overnight visitors in coastal Mediterranean areas (approximately 14 and 15 million international and national overnight visitors, respectively).

Among countries bordering the sub-region, coastal areas of Italy register one third of its international arrivals and two thirds of the domestic ones.

Table 60. International and domestic arrivals in the Ionian and Central Mediterranean Sea sub-region in 2012

Region	Coastal Mediterranean Areas (000s)			Total Mediterranean Countries (000s)		
	International	Domestic	Total	International	Domestic	Total
Ionian Sea and Central Med	**13 811**	**14 928**	**28 739**	**16 950**	**19 523**	**36 473**
% Mediterranean Sea	9%	7%	**8%**	6%	3%	**4%**
Mediterranean Sea	**153 355**	**215 178**	**368 533**	**298 562**	**558 731**	**857 293**

UNWTO, 2014. Values for Libya are not available. International arrivals in Mediterranean coastal areas have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Economic Analysis

In 2012, the total revenues of tourism and recreational activities in the Ionian Sea and Central Mediterranean attained 30 billion Euros, which represent 6% of total revenues of tourism at the Mediterranean level. Tourism turnover in coastal areas reached 23 billion Euros, 9% of coastal Mediterranean tourism (Table 61), which is due to the fact that most of the tourism activities in this sub-region concentrate in littoral areas, as seen in the previous section regarding tourist arrivals in the sub-region.

Similarly, the gross value added of total tourism in the sub-region amounts to 17 billion Euros, 6% of the regional figures, while coastal GVA generates 13 billion Euros, 10% of regional GVA produced by tourism located in coastal areas.

Table 61 Turnover, direct and total contribution to GDP of the Ionian Sea and Central Mediterranean sub-region

Region	Turnover (Million EUR)		GDP Direct Contribution Gross Value Added (Million EUR)		GDP Total Contribution (all façades) (Million EUR)
	Coastal areas	Total	Coastal areas	Total	Total
Ionian Sea and Central Med	**22 871**	**29 869**	**13 237**	**17 076**	**41 326**
% Mediterranean Sea	9%	6%	10%	6%	6%
Mediterranean Sea	**250 786**	**522 260**	**135 233**	**282 580**	**729 271**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

In all cases, Italy and Greece together account for 75% of the tourism revenues and gross value added estimated for the Ionian Sea and Central Mediterranean.

Social Analysis

Employment figures in the Ionian Sea and Central Mediterranean are similar to the ones registered in the Adriatic Sea. The tourism sector provides more than 450 000 direct jobs in the sub-region, which rise up to 1 million jobs when indirect and induced employment are considered. These represent around 6% of the Mediterranean regional figures (Table 62).

Regarding coastal tourism, the Ionian Sea and Central Mediterranean values slightly increase, since 80% of tourism employment in the sub-region is coastal. It represents around 12% of the total tourism employment in Mediterranean coastal areas: almost 400 000 direct jobs and over 800 000 total (direct, indirect and induced) jobs. The Italian and Tunisian tourism provide two thirds of the direct employment in coastal areas of the Ionian Sea and Central Mediterranean.

Table 62. Direct and total contribution to employment of tourism and recreational activities in the Ionian Sea and Central Mediterranean sub-region

Region	Direct Contribution of Tourism to Employment (000 jobs)		Total Contribution of Tourism to Employment (000 jobs)	
	Coastal areas	Total	Coastal areas	Total
Ionian Sea and Central Med	**385**	**464**	**838**	**1 022**
% Mediterranean Sea	12%	6%	10%	5%
Mediterranean Sea	**3 297**	**7 532**	**8 450**	**19 063**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Aegean Levantine Sea

The Aegean-Levantine Sea covers the eastern part of the Mediterranean and is surrounded by Cyprus, Egypt, Greece, Israel, Lebanon, Palestine, Syria and Turkey.

Sector Analysis

The Aegean-Levantine Sea sub-region registers the highest tourist rates in the Mediterranean basin after the Western Mediterranean. Almost 165 million arrivals are recorded in the sub-region, which represent 20% of the Mediterranean total arrivals. More than 70 million international overnight visitors make a quarter of the total international tourism in the Mediterranean Sea, while the share slightly drops to 17% when domestic tourism is taken into account (over 90 million visitors). Just as for the Western Mediterranean and the Adriatic Sea, in the past decades international tourist arrivals in this sub-region have also experienced a constant growth, which was briefly interrupted by a short fall in levels in 2009.

Half of the total tourist arrivals in the Aegean-Levantine basin concentrate in coastal areas: almost 90 million tourist arrivals represent a quarter of the total coastal Mediterranean tourism (Table 63). These are fairly equally divided between international and domestic arrivals (42 and 45 million, respectively).

Turkey, and to a minor extent Greece, show the highest tourist international and domestic arrivals in the Aegean-Levantine Sea and together account for around 80% of total overnight visitors in the sub-region.

Table 63. International and domestic arrivals in the Aegean-Levantine Sea sub-region in 2012

Region	Coastal Mediterranean Areas (000s)			Total Mediterranean Countries (000s)		
	International	Domestic	Total	International	Domestic	Total
Aegean Levantine Sea	**41 603**	**45 477**	**87 080**	**71 117**	**93 166**	**164 283**
% Mediterranean Sea	27%	21%	**24%**	24%	17%	**19%**
Mediterranean Sea	**153 355**	**215 178**	**368 533**	**298 562**	**558 731**	**857 293**

UNWTO, 2014. International and domestic arrivals in Mediterranean coastal areas have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Economic Analysis

In 2012, total revenues of tourism and recreational activities in the Aegean-Levantine Sea sub-region account for 100 billion Euros, which represent a fifth of total revenues of tourism at the Mediterranean level (Table 64). Tourism in coastal areas generates a turnover of almost 60 billion Euros, accounting for a quarter of coastal Mediterranean revenues.

Similarly, the GVA of total tourism in the sub-region accounts for 20% of the total Mediterranean GVA. Regarding coastal tourism, the value accounts for 23% of the GVA generated by coastal tourism in the Mediterranean region.

Turkey and Greece record the highest tourism revenues and GVA in the Aegean-Levantine Sea, together accounting for two thirds of the sub-regional figures.

Table 64 Turnover, direct and total contribution to GDP of the Aegean-Levantine Sea sub-region

Region	Turnover (Million EUR)		GDP Direct Contribution Gross Value Added (Million EUR)		GDP Total Contribution (all façades) (Million EUR)
	Coastal areas	Total	Coastal areas	Total	Total
Aegean-Levantine Sea	**58 534**	**103 543**	**31 470**	**58 029**	**150 938**
% Mediterranean Sea	23%	20%	23%	21%	21%
Mediterranean Sea	**250 786**	**522 260**	**135 233**	**282 580**	**729 271**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

Social Analysis

The tourism sector provides more than 2.5 million direct jobs in the Aegean-Levantine Sea sub-region, almost 7 million jobs when indirect and induced employment is added. This represents around 35% of the Mediterranean numbers (Table 65).

Regarding employment figures in coastal areas, tourism generates more than 1 million direct jobs, while total jobs amount to 3 million (around one third of Mediterranean tourism coastal employment). The tourism and recreational activities sector in the coastal areas of Turkey, Egypt and Greece already provides for 80% of the total number of jobs in the Aegean-Levantine sub-region.

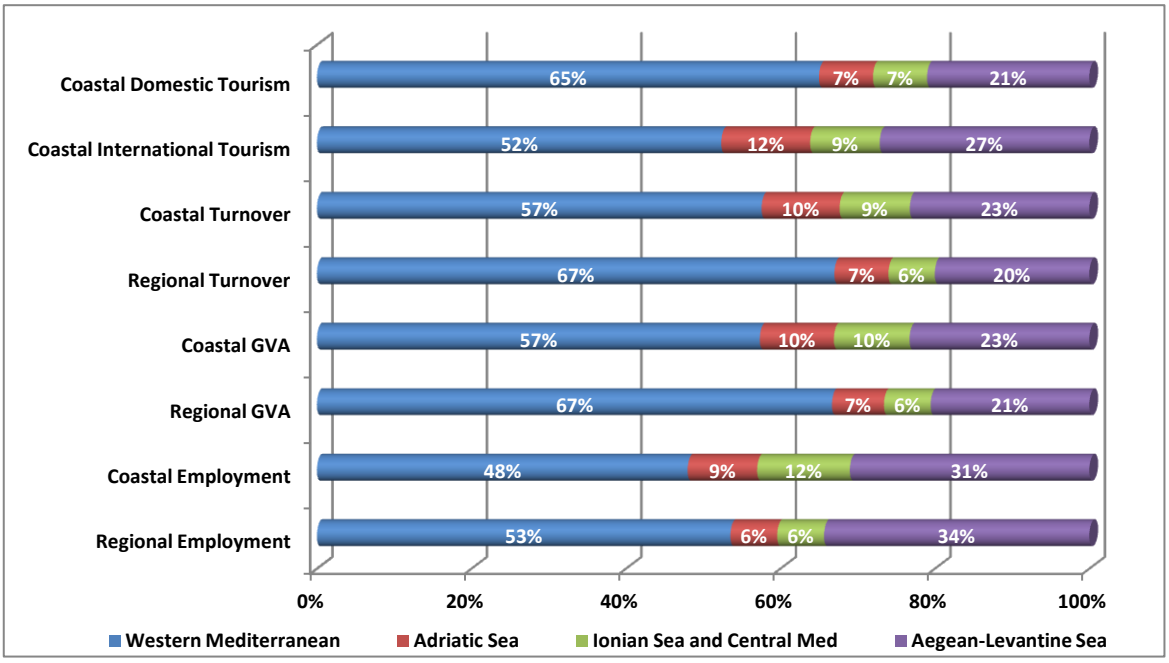
Table 65. Direct and total contribution to employment of tourism and recreational activities in the Aegean-Levantine Sea sub-region

Region	Direct Contribution of Tourism to Employment (000 jobs)		Total Contribution of Tourism to Employment (000 jobs)	
	Coastal areas	Total	Coastal areas	Total
Aegean-Levantine Sea	**1 031**	**2 574**	**2 858**	**6 832**
% Mediterranean Sea	31%	34%	34%	36%
Mediterranean Sea	**3 297**	**7 532**	**8 450**	**19 063**

Data have been extracted from the WTTC country factsheets (2013) referring to the year 2012. Mediterranean coastal shares have been calculated based on Plan Bleu estimations (Plan Bleu, 2005).

3.3.5 Overview of tourism and recreational activities in the Mediterranean sub-regions

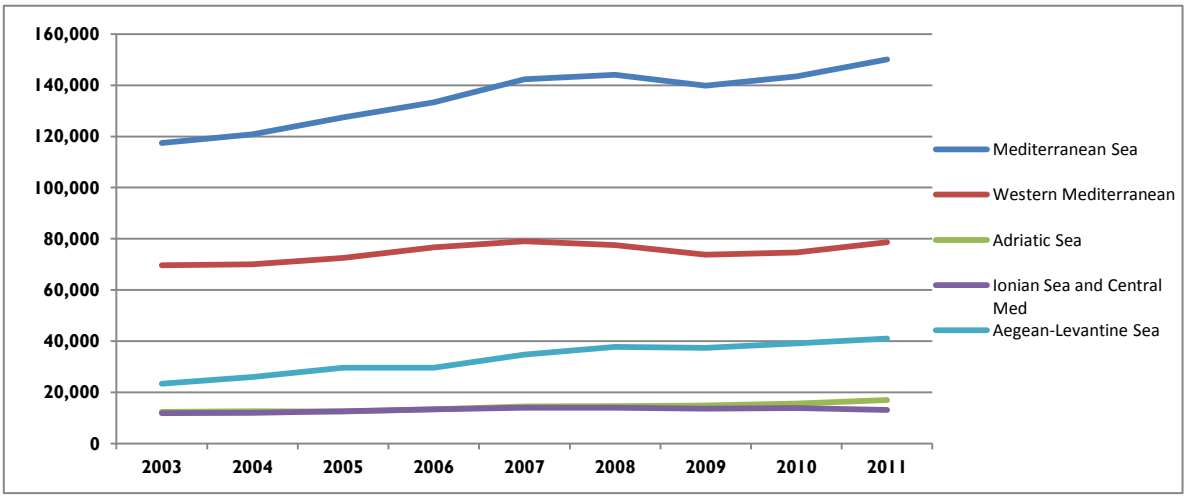
The following figure summarizes main sector, economic and social indicators characterizing tourism and recreational activities among the different Mediterranean sub-regions considered in the assessment:



3.3.6 Perspectives and future trends for the tourism and recreational activities sector

According to the UNWTO long-term outlook (2013), the number of international tourist arrivals worldwide is expected to increase by 3.3% a year on average from 2010 to 2030, reaching a total of 1.8 billion arrivals by 2030.

Figure 4. International arrivals in coastal areas in the Mediterranean region and sub-regions, in thousands (1990 - 2011)



Over the last 20 years, the Mediterranean tourism has distinguished itself by its development in the northern rim of the Mediterranean (Lanquar, 2012); in contrast, current analyses on future trends show an increasing tourism activity throughout the whole Mediterranean basin. Some areas, such as the Eastern Mediterranean and the North African countries, may undergo a significant increase in tourism activities in the coming years. In particular, countries such as Croatia, Greece, Morocco, Tunisia and Turkey tend to present more dynamic growth patterns than more mature destinations (France, Italy, Spain), with tourism

activities spreading along their coastlines. In addition, it is expected that countries benefiting from coastal and marine areas with important biodiversity characteristics will be more attractive for tourism (e.g. the Alboran coast, the Liguro-Provençal coast, the Corso-Sardinian coast, the Southern Tyrrhenian coast as well as the Algerian-Tunisian coasts, in the Western Mediterranean; the Dalmatian coast, in the Adriatic Sea; the Eastern Ionian coast and islands and the Gulf of Gabes, in the Ionian Sea and Central Mediterranean; and the Aegean Sea and Anatolian coasts, the Cilician and Cyprus coast, in the Aegean-Levantine Sea).

Several key factors need to be taken into consideration to foresee tourism development in the coming years: first, the investment in tourism equipment and infrastructure along with the on-going democratic processes in the southern and eastern rims of the Mediterranean; second, the efficient and innovative use of information and communication technologies (ICTs) by developing countries, which may contribute to a more equitable distribution of benefits between the various actors of the Mediterranean tourism sector; third, the development of new products and services such as nautical, medical, religious and cultural tourism and cruises, which should lead to the re-examination of the homogenous brand identity of the Mediterranean as purely a "sea, sand and sun" destination. Finally, security and adaptability to climate change are two factors that will strongly influence the development of the tourism sector. Political instability has devastating effects on international tourist arrivals (and, as such, they have been observed in recent years). However, current events seem to come along with democratic processes, what is generally favourable to the development of tourism. On the other side, impacts of climate change, related to sea level rise as well as water and energy availability, could also seriously affect the sector. This should be countered by the development of renewable energies, eco-building, eco-mobility and eco-transportation, coastal management, oasis and desert development (Lanquar, 2012).

3.3.7 Environmental pressures derived from tourism and recreational activities

Tourism and recreational activities create, and possibly also conserve, wealth in the Mediterranean basin. However, while tourism provides certain economic benefits to a region at least in the short term, it also causes environmental impacts and local cultural disturbance (see Table 66). Although environmental pressures associated with tourist and recreational activities are mostly seasonal and spatially concentrated, the resulting environmental degradation involves the long term and needs to be carefully considered: tourism contributes to all forms of environmental degradation, but is in turn adversely affected by the impacts on the natural resources on which it relies.

The tourism sector in the Mediterranean region has expanded following a mass tourism model based on quantities. Mediterranean marine and coastal environments are under threat due to inappropriate practices and development. Intensive tourism development in coastal fringes has already caused major damage to coastal ecosystems. The projected growth of tourism in the region will -without a model shift- continue to worsen the situation, damaging landscapes, causing soil erosion, putting pressure on endangered species, straining available water resources, increasing waste and pollution discharges into the sea and leading to cultural disruption.

Tourism involves a temporary rise in the coastal population, which increases resource and infrastructure demand (water, food, soil, energy and construction material) and increases waste and wastewater generation. Artificial surfaces occupied by housing, services and recreation in coastal zones (harbours, marinas, transport, waste and water treatment facilities, etc.) and the armouring of shorelines by coastal defence equipment and harbours lead to alterations in coastal landscapes, destruction of coastal habitats, changes in local hydrodynamics and coastal erosion. An increase in the number of visitors in fragile coastal areas (dunes, wetlands, beaches and seacliffs) has an impact on the conservation status of natural sites and species. Beach nourishment, needed to maintain beach functionality, causes physical damage to the seafloor, alters marine water quality and disturbs benthic communities.

At the beginning of the last decade, Mediterranean waters received annually 10 billion tons of industrial and urban wastewaters with little or no purification (WWF, 2001). The production of wastewater and

solid waste in tourist areas often exceeds the carrying capacity of local infrastructures due to high seasonal demand. Pollution negatively affects water quality in beach areas and drinking water supplies, with severe human health implications.

Recreational boating activities cause damage to habitats and species, particularly due to collisions and underwater noise; boat anchors, especially in sites containing meadows or coralligenous formations; pollution by oil, waste and wastewater discharges; release of antifouling substances; and the voluntary or involuntary introduction of non-indigenous species stuck to boat's hulls or hanging to their anchors. Wild species and underwater landscapes watching (e.g. whale watching, scuba diving) cause damage if the rules necessary for the safeguarding of the species and habitats are not enforced, or if endangered species are taken out of their environment.

Finally, tourism also causes disturbance to the local way of life and social structures, and can adversely affect traditional practices that contribute to the conservation and sustainable use of biodiversity. Additional resource-use conflicts may occur between tourism and local populations as they compete for limited resources of water, sanitation, energy and land uses (UNEP/MAP/RAC SCP, 2013).

Table 66. Environmental impacts of tourism and recreational activities in the Mediterranean Sea. Impacts have been aggregated according to EcAp's Ecological Objectives

		DESCRIPTION OF IMPACTS	
		Coastal/ Construction of infrastructure	***Recreation***
EOs - ECOLOGICAL OBJECTIVES		***Hotels, marinas, transport, waste water facilities***	***Golf courses, water sports, beach access, water parks, parking…***
EO1	Biological diversity	Tourist facilities mostly developing near fragile marine ecosystems Altering wild animal behaviour Loss of biodiversity in coastal terrestrial and marine areas, in particular rare, endangered or endemic species	Bathing near turtle nesting sites Disturbing of marine species: cetaceans, seals, seabirds, turtles Extinction of population of certain species (e.g. Mediterranean monk seal) from areas where they were traditionally present
EO3	Commercial species	Seafood consumption: pressuring on local fish populations and even contributing to overfishing	
EO5	Eutrophication	Local, derived from discharges of untreated waste water directly into the marine environment and agricultural run-off	Releases of treated/ untreated waste water Generation of a greater volume of waste water
EO6	Sea-floor	Alteration of water quality (e.g. turbidity, water transparency, sediment resuspension, sediment releases) affecting benthic habitats such as seagrass meadows, coralligenous assemblages, etc., leading to their destruction	Boating, anchoring, diving, snorkelling affects seafloor habitats, including endemic seagrass meadows and coralligenous assemblages Extraction of building materials (e.g. sand) leading to erosion and destruction of habitats
EO7	Hydrographic conditions	Sediment stirring up; Development of marinas and breakwaters can cause changes in currents and coastlines	Water shortages and degradation of water supplies; Excessive extraction of water can result in water scarcity. If the water comes from wells, over pumping can cause saline intrusion into groundwater
EO8	Coastal areas' natural dynamics	Artificialisation, compactation and sealing of the coastal fringe Construction of tourist facilities causing severe disturbance and erosion of the local ecosystem	Large scale beach and sand dune erosion Alteration of natural beach nourishment Modification of dune soils, loss of natural vegetation, disturbance of sensitive wildlife and extra demands on limited water resources
EO9	Contaminants	Local, emptying sewage directly into the marine environment/ Indirect inputs of pollutants from streams derived of torrential rainfalls	Releases of oil and chemicals
EO10	Marine litter	Emptying waste into the marine environment	Releases of solid waste and littering
EO11	Noise	Land-based sources of noise pollution	Noise from motor boats and jet skis, cars and buses, nightlife and other activities

Source: Satta, 2004

3.3.8 Data gap analysis

According to the analysis conducted, recent tourist data are available for all Mediterranean countries (except, in some cases, for Libya and the Palestine), yet at the national scale only. Therefore, it is often difficult to assess directly socioeconomic impacts of tourism and recreational activities in coastal areas. In addition, due to the issue of national statistics aggregation, the assessment of maritime façades belonging to different Mediterranean sub-regions has been estimated, on account of the lack of accurate information, which might have led to an over/underestimation of the sub-regional results.

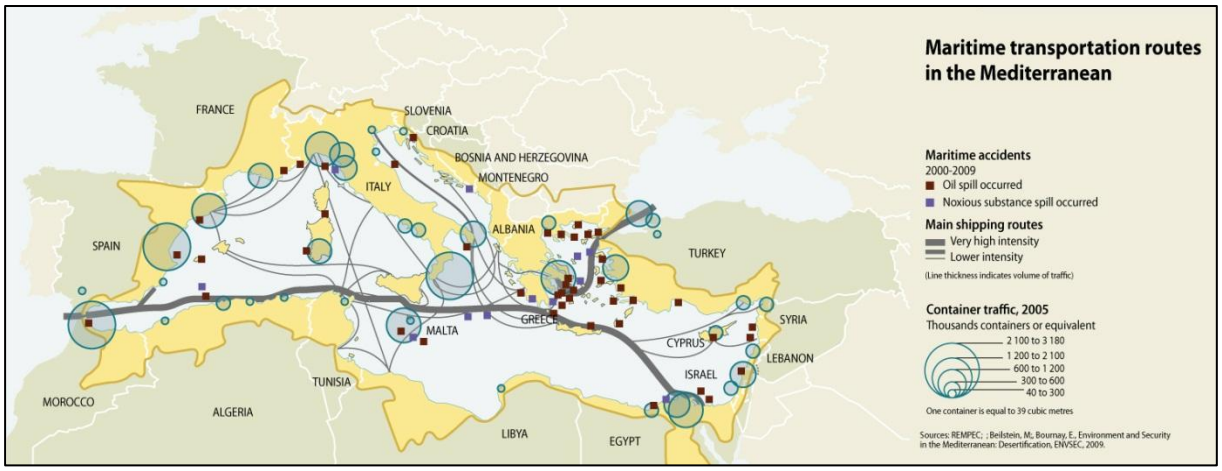
3.4 MARITIME TRANSPORT IN THE MEDITERRANEAN SEA

3.4.1 Introduction

General context

Throughout the last century the shipping industry has experienced a general trend of increases in terms of total trade. Today, more than 90% of global trade in volume is carried by sea. Increasing industrialization and globalization as well as the liberalization of national economies have fuelled free trade and a growing demand for consumer products (IMO, 2012). In addition, advances in technology have also made shipping an increasingly efficient and swift method of transport. The main driver of the shipping industry is the tonnage of seaborne trade (imports and exports). According to UNCTAD, there are circa 60 000 merchant ships trading internationally that generate an estimated annual income over 290 billion Eeuros in freight rates within the global economy whereas total turnover of the world maritime and shipping industry (including merchant ship, shipbuilding, ship breaking, ship repair sectors) is around 1400 billion Eeuros (Douglas-Westwood, 2005).

Figure 5. Mediterranean routes of maritime transportation, 2013



Source: GRID-Arendal, http://www.grida.no/graphicslib/detail/maritime-transportation-routes-in-the-mediterranean_e5bd.

The Mediterranean Sea, bound by the Strait of Gibraltar on its western side and the Suez Canal and the Bosporus Strait on the eastern side, is amongst the world's busiest areas for maritime activities. It offers a route for exchanges of manufactured products between Europe and Asia, as well as for the supply of Europe with energy products from the Gulf countries. Around 24% of goods tonnage consists of energy products, and non-bulk goods account for 36% of the total. Intra-Mediterranean fluxes account for less than a quarter of total Mediterranean traffic (Plan Bleu, 2010).

Vessel activity in the Mediterranean has been rising steadily since the end of the 90s and during the 2000s. Port callings increased by 14% and transits by 20% between 1997 and 2006 (Lloyd's MIU, 2008). However, the shipping industry in the Mediterranean– such as worldwide- was hit hard during the recent recession due to a combination of slowdowns in trade, associated reductions in freight rates and the subsequent lack of liquidity available from European banks, which resulted in more stringent lending policies that impeded fleet modernization and consolidation efforts. Despite these difficult conditions, some fleets, such as the Greek shipping industry, have been able to respond and recover during the last years (Kamarudin, 2012).

Activity description

The maritime and shipping industry involves a number of services, ranging from maritime transport services to port services, including the shipbuilding and ship repair sub-sectors. Each of these businesses are organised in complex ways.

Traditionally, the pillars of the maritime transport sector have been:

- International shipping: transport of passengers or freight between ports in different countries.
- Auxiliary services such as cargo-handling, storage and warehousing, stevedoring, freight forwarding, customs clearance services, container-station and depot services.
- Access to and use of port facilities, such as pilotage, towing and tug assistance, provisioning, garbage collection, port captain's services, and anchorage.

A fourth pillar, "multimodal transport" has emerged much recently and consists of a "door-to-door service", involving the use of one or more transportation "modes" (i.e. road, rail, air or inland water transport) in addition to shipping by sea (UNWTO).

There are two broad categories of shipping: bulk (e.g. complete shiploads of commodities) and liner services (crates, containers, etc. of freight, as well as passengers). Some are relatively competitive, such as bulk shipping; others, such as much of liner shipping, are dominated by rate-setting bodies (also called conferences), bilateral arrangements or monopolies. Many countries exempt these conferences from anti-monopoly laws (UNWTO). Some of the shipping services are operated by state enterprises while others have been privatized.

Seaborne shipping and its international liberalisation is further complicated by the use of flags of convenience. Flag of convenience laws mean that ships can be owned by nationals of one country and be registered in another. Most ships in the major ship-owning nations sail under flags of convenience (US, Greek, Japanese, Hong Kong, UK and German ships, according to UNCTAD). In this sense, over the last decade, vessels flagged in Mediterranean riparian states have accounted for about 40-45% of vessels operating within or through the Mediterranean. Almost 80% of vessels in transit via the Mediterranean (between non-Mediterranean ports) are registered under a non-Mediterranean State flag. Around 57% of vessels operating within or through the Mediterranean in 2006 were owned by companies located in a Mediterranean country (Lloyd's MIU, 2008).

3.4.2 Methods, data and assumptions

The following section presents the maritime transport activities taking place in the Mediterranean Sea basin, and specifically in its sub-regions: Western Mediterranean, Adriatic Sea, Ionian Sea and Central Mediterranean and Aegean-Levantine Sea.

Sector analysis

- **Ports in the Mediterranean Sea**

Information on ports (number and location) has been obtained from the study conducted by Keller et al. (2011), who generated a dataset of port locations and ship voyage at the global scale, using information from the Lloyd's Maritime Intelligence Unit (the world's largest provider of global maritime data and information services) on ports and terminals with recorded ship movements. The information on ports was collected using open source GIS software which allowed selecting specifically ports located in the Mediterranean basin and in each of the sub-regions considered.

- **The Mediterranean merchant fleet**

Statistics on the merchant fleet registered in Mediterranean countries have been obtained from the UNCTAD Databases, which record merchant vessels by registration flag as well as by type of ship, on an annual basis from 1980 to 2013. Figures cover seagoing propelled merchant ships of 100 gross tons and above, excluding inland waterway vessels and fishing vessels (from 2011 onwards). The number of ships and their carrying capacity (in deadweight tonnage), have been collected for all Mediterranean countries, including vessel type (oil tankers, bulk carriers, general cargo, container ships and other). Data for Bosnia and Herzegovina and Palestine were not available. Mediterranean shares, allowing distinguishing among different maritime façades for the regional analysis, along with sub-regional shares,

allowing the characterisation of the four Mediterranean sub-regions, have been calculated by means of ratios based on Mediterranean coastal lengths (see Appendix 2, data and calculations).

- **Mediterranean freight and passenger transport**

Measures of container flows in the Mediterranean region have been obtained from the World Bank statistical database. Data on container port traffic is available for each country, from 1980 to 2011, in TEU (Twenty feet Equivalent Unit, a standard-sized container) and it is aggregated at the national level. No data was available for Bosnia and Herzegovina, Montenegro and Palestine.

Detailed information of maritime transport of goods and passengers through the Mediterranean Sea is available in Eurostat, both for the eight EU Member States and Turkey, as well as for the Southern and Eastern Mediterranean Countries[11] (SEMC).

For European countries, statistics aggregated at the NUTS 2 level are available both for goods and passenger transport. NUTS 2 is an administrative division that allows gathering information at one level lower than national. This fact enables a better regional and sub-regional analysis for countries with marine waters belonging to different marine areas (France, Spain or Turkey) or even to different Mediterranean sub-regions (Greece and Italy). All European countries report information on goods flow; in contrast, Cyprus and Slovenia do not report information on passenger flows.

For the SEMC, data are specified at the national level, which does not allow considering only the Mediterranean façade in the case of Morocco or Egypt. A similar situation is found for Tunisia: the national aggregation of statistics does not allow distinguishing its Western Mediterranean maritime façade from the Ionian Sea and Central Mediterranean one.

Therefore, in the cases where statistics are found aggregated at the national level (container throughput, transport of goods and passengers), regional and sub-regional estimates have been calculated by means of approximate ratios according to the coastal length of each maritime façade in order to consider uniquely the Mediterranean regional or sub-regional façades.

In all cases, data on passenger flows include cruise passengers. However, since the cruise sector constitutes a different activity, the socioeconomic analysis does not focus on it.

Economic and Social Analysis

- **EU Member States and Turkey**

Data on economic and social indicators for the Mediterranean region have been partially found and extracted from Eurostat, in particular for all the Mediterranean countries belonging to the EU (Croatia, Cyprus, France, Greece, Italy, Slovenia and Spain) as well as for Turkey. These data were not available for Malta.

Therefore, the socio-economic information (turnover, GVA and contribution to employment) related to the maritime transport activity has been collected from Eurostat statistical databases. This includes not only data on maritime transport services, but also on sub-sectors such as shipbuilding and port services.

These statistical data is presented in Eurostat at the national level, according to the "Statistical classification of economic activities in the European Community" (NACE[12]), a four-digit classification providing the framework for collecting and presenting a large range of statistical data according to economic sectors (e.g. production, employment and national accounts). As for the sector analysis, ratios based on coastal lengths of regional and sub-regional façades have been applied to estimate the share of these sectors in the Mediterranean region and sub-regions.

- **Other Mediterranean countries**

[11] Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Syria and Tunisia. Data from Jordan has not been considered in this study.
[12] Deriving from the French « Nomenclature statistique des Activités économiques dans la Communauté Européenne ».

Economic and social indicators describing the maritime transport sector are hardly publicly available in the rest of the Mediterranean countries. Some of the Mediterranean countries not belonging to the EU are therefore not subject to Eurostat reporting, i.e. Albania, Bosnia and Herzegovina, Egypt, Israel, Montenegro and Tunisia.

In these cases, economic and social indicators regarding the maritime transport services sub-sector (turnover, GVA and employment) have been estimated based on the trade balance of payments reported in the UN World Trade Organization (UNWTO) Service Profiles. For each country, the sector's turnover is assumed to be the economic value of total imports and exports by sea. Values for the sector's GVA and its contribution to employment have been estimated from the turnover, using calculated conversion factors based on the studies and data of Kalaydjian (2001) regarding French maritime activities and, in particular, the maritime transport sector.

To complement information on the shipbuilding and port services sub-sectors, indicators have been estimated based on the data found for the EU Member States and Turkey. Average ratios "shipbuilding/ total maritime transport" and "port services/ total maritime transport" calculated for each sub-region have been used to estimate socioeconomic indicators of all maritime transport sub-sectors in Albania, Bosnia and Herzegovina, Egypt, Israel, Montenegro and Tunisia.

These data are neither specific to the Mediterranean façades of these countries; therefore, and such as for the previous analyses, ratios based on coastal lengths of regional and sub-regional façades have also been applied.

As stated in the previous section, since no data was available for Malta in Eurostat, all indicators regarding maritime transport have been estimated using these methods.

In the cases of Algeria, Lebanon, Libya, Palestine and Syria, no official information has been found.

Data and calculations are presented in Appendix 2.

3.4.3 Sector and socioeconomic analysis for the Mediterranean regional area

Sector Analysis

- **Ports**

There are more than 600 ports and terminals in the Mediterranean Sea with recorded ship movements (Keller et al. 2011), almost half of which are located in Greece and Italy. Several top ports of the Mediterranean Sea lie among the 100 world top ports, in terms of port calls, deadweight tonnage, container flows and cargo volume (Table 67). In 2006, the Lloyd's MIU recorded over 250 000 port calls within the Mediterranean.

Table 67. Port ranking according to different parameters in the Mediterranean Sea

Top Ports Calls*	Top Ports DWT*	Top Container Ports**	Top Cargo Volume Ports**
Barcelona, Spain	Gibraltar, Gibraltar	Valencia, Spain	Marseilles, France
Leghorn, Italy	Fos, France	Algeciras, Spain	Algeciras, Spain
Genoa, Italy	Algeciras, Spain	East Port Said, Egypt	Valencia, Spain
Gibraltar, Gibraltar	Gioia Tauro, Italy	Gioia Tauro, Italy	Genoa, Italy
Valencia, Spain	Augusta, Italy	Tanger, Morocco,	Trieste, Italy
Algeciras, Spain	Valencia, Spain	Barcelona, Spain	Alexandria and El-Dekheila, Egypt
Alexandria, Egypt	Piraeus, Greece	Genoa, Italy	Barcelona, Spain
Piraeus, Greece	Genoa, Italy	La Spezia, Italy	
Algiers, Algeria	Barcelona, Spain	Haifa, Israel	
Venice, Italy	Naples, Italy.	Ahsdod, Israel	

*Lloyd's MIU, 2008
**World Shipping Council, 2011

- **The Mediterranean merchant fleet**

Recent statistics show that the Mediterranean merchant fleet is composed of almost 10 000 vessels (Table 68).

From the mid-90s to the mid-2000s, the Mediterranean recorded a rise of 58% of its transit capacity. This fact reflects the increased size of vessels operating in the Mediterranean which grew, on average, by 30% since 1997. In terms of deployed capacity, the current merchant fleet registered in the basin totals 224 million tons in deadweight tonnage (DWT), while the average size of vessels is 23 500 tons in DWT. The largest vessels observed in the Mediterranean are crude oil tankers and bulk carriers.

The Mediterranean is both a major load and discharge centre for crude oil. Major traffic lanes are dominated by crude oil shipments originating in the eastern Black Sea or in northern Egypt, towards Mediterranean destinations and ports west of Gibraltar; as well as exports from the Persian Gulf through the Mediterranean via the Suez Canal. Approximately 18% of global seaborne crude oil shipments take place within or through the Mediterranean. North African ports in Libya, Algeria, Tunisia, as well as the Persian Gulf oil shipped via Egypt, account for over 90% of all crude oil loaded in the Mediterranean. Italy accounts for nearly half of all crude oil discharged in the Mediterranean. In the LNG sector, exports from North African countries to other Mediterranean destinations predominate.

Container vessel port calls represented 71% of total port calls in 2006 (before the global crisis) whilst transits had increased by 85% in a ten-year period (1997-2006). In addition, the size of container vessels calling and transiting have also increased, by 50% and 33% respectively since 1997 (Lloyd's MIU, 2008).

Table 68. The Mediterranean merchant fleet: detail of the number of ships and carrying capacity

Mediterranean Sea	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total Fleet
Number of ships	**1 387**	**1 291**	**1 556**	**426**	**3 386**	**8 045**
Deadweight tonnage (Million tons)	**89**	**91**	**8**	**16**	**9**	**213**

All data have been extracted from UNCTAD, and correspond to year 2013. No data is reported for Bosnia and Herzegovina and Palestine. Only Mediterranean façades.

- **Freight transport and passenger flow**

Mediterranean riparian states account for around 20% of the world seaborne trade. At present, the Mediterranean container flow represents 10% of the total world flow, which peaks up to 570 million TEUs.

Up to 2008, the growth of the container throughput (container handled at ports, including the port of origin, destination and transhipment) in the Mediterranean Sea had increased significantly and continuously, with a growth from 24 million TEU in 2001 to 49 million TEU in 2008, an increase of about 102% (World Bank). During the same period, world container throughput went from 88 million to 530 million TEU, an increase of 500%. The surge of both container traffic and throughput is linked with the growth of international trade in addition to the adoption of containerization as privileged vector for maritime shipping and inland transportation. Until 2008, trends of container throughput in the Mediterranean Sea behaved similarly to the global trends, in constant growth. However, the financial crisis of 2009-2010 had a significant impact on container flows, which experienced a drop of 3 million TEUs in 2008 and 2009 (World Bank).

Table 69. Freight and passenger transport by sea in the Mediterranean region

	Mediterranean Sea	World	% World
Container Transport (million TEUs)*	**34**	573 [a]	**6 %**
Freight Transport (million tons)**	**1 632**	8 700 [b]	**19 %**
Passenger Transport (000 passengers)***	**171 113**		

* World Bank, data correspond to 2011. No data for Bosnia & Herzegovina, Montenegro and the Palestine. Only Mediterranean façades.
** Data from 2009-2010. Eurostat EU Member States and EUROSTAT SEMC (no data reported for Syria). Only Mediterranean façades.
*** Data from 2009-2010. Eurostat EU Member States (no data reported for Slovenia and Cyprus) and Eurostat SEMC (no data reported for Syria). Only Mediterranean façades. No data available for Libya, Palestine, Bosnia & Herzegovina, Albania, Montenegro.
[a] Container world figures: UNCTAD (2011).
[b] Total volume of goods loaded worldwide (including container and bulk trades).

Economic and Social Analysis

Total revenues of maritime transport sub-sectors amount to more than 70 billion Euros in the Mediterranean Sea, which generate a GVA of 27 billion Euros. Circa 550 000 jobs are directly created by this sector (Table 70).

These results reflect the Mediterranean maritime transport services sector, port services and the shipbuilding sector[13]. No information has been found for Algeria, Lebanon, Libya, Palestine and Syria.

Table 70. Socioeconomic impacts of maritime transport in the Mediterranean Sea

Region	Turnover (million EUR)	GVA (million EUR)	Employment (N direct jobs)
Mediterranean Sea	**70 315**	**26 802**	**550 622**
% Mediterranean Sea	5 %	-	-
World	**1 400 000**	-	-

NACE Rev. 2., Eurostat for: Croatia, Cyprus, France, Greece, Italy, Slovenia, Spain and Turkey. No data reported for Malta. Values correspond to year 2010; when data had not been updated or were not available, values for 2009 were taken.
UNWTO, for: Albania, Bosnia and Herzegovina, Egypt, Israel, Montenegro, Morocco and Tunisia. Values correspond to years 2010 and 2011. Only Mediterranean façades.
No data sources have been found for maritime transport socioeconomic statistics for Algeria, Lebanon, Libya, Palestinian Terr., and Syria.

3.4.4 Sector and socioeconomic analysis for the Mediterranean sub-regional areas

Western Mediterranean

The Western Mediterranean sub-region is surrounded by Algeria, France, western Italy, Morocco, Spain and northern Tunisia.

Sector analysis

[13] See the "Methods, data and assumptions" section.

- **Ports**

The Western Mediterranean Sea sub-region accounts for almost 200 ports and terminals (Keller et al., 2011), which are located in Algerian, French, Gibraltar, Monaco, Moroccan and Spanish coasts, and represent a third of total ports of the Mediterranean Sea.

Most of the top ports of the Mediterranean Sea are located in this sub-region, mainly on its northern shores (Table 67). Regarding the southern countries, whereas the Moroccan port sector is undergoing a significant reform since 2006, Algerian ports appear saturated and in need of infrastructure renovation. With the exception of oil and gas terminals, the maritime transport and port sectors have received rather little investment in comparison to other transport sectors. In contrast, almost all Algerian international trade moves by sea and, the Algerian economy basically relying on the energy sector (oil and gas), energy products are the bulk of exports. A reorganisation and modernisation of ports is needed –and planned- to meet current demands and facilitate trade and transport[14].

- **The merchant fleet in the Western Mediterranean**

According to UNCTAD, the total merchant fleet registered in Western Mediterranean countries amounts to almost 1500 vessels (19% of the total Mediterranean fleet), which in terms of carrying capacity amount to 17 million tons DWT (8% of the region's carrying capacity). The Italian fleet accounts for 65% of the sub-regional fleet, and together with the French and Spanish fleet, for 90% of the sub-regional fleet, while Algeria and Morocco together represent 10%.

Table 71. The Western Mediterranean merchant fleet

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total Fleet
Western Mediterranean	**160**	**69**	**160**	**25**	**1 079**	**1 493**
% Total Western	11%	5%	11%	2%	72%	100%
% Mediterranean Sea	12%	5%	10%	6%	32%	19%
Mediterranean Sea	**1 387**	**1 291**	**1 556**	**426**	**3 386**	**8 045**

All data have been extracted from UNCTAD, and correspond to year 2013. No data is reported for Bosnia and Herzegovina and Palestine. Only Mediterranean façades.

It should be noted that despite the fact that the Algerian fleet accounts today for a modest 7% of the Western Mediterranean fleet, it played during the 80s a significant role at the global level and ranked among the 50 world first fleets. In spite of the increasing maritime transport demand and the importance of international trade in the Algerian economy, the Algerian fleet has experienced a decline during the last two decades[15]. Given the potential of the sector and the strategic location of the country with respect to the maritime routes, a recovery of the Algerian maritime transport is expected, coming with the sector's modernisation and managerial reforms.

Most of the recorded Western Mediterranean vessels in the sub-region fall into the "other types" category (72%), and therefore the characterisation of the fleet is rather difficult. However, oil tankers and cargo vessels account for almost 20% of total sub-regional fleet. Regarding vessel's deadweight tonnage, oil tankers and container ships account for the largest numbers, and together represent two thirds of the carrying capacity in the Western Mediterranean.

[14] See Mohamed-Chérif F-Z and Ducruet C. (2012) Du global au local : les nouveaux gérants des terminaux portuaires algériens. L'Espace Politique, 16, 2012-1.

[15] See Z. Mehdaoui, in press : Faute d'une flotte nationale conséquente: Main basse sur le transport maritime, Le Quotidien d'Oran, 6 mars 2013.
http://www.algeria-watch.de/fr/article/eco/main_basse_transport_maritime.htm

Table 72. Deadweight tonnage of merchant fleet in the Western Mediterranean sub-region (Million Tons)

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total fleet
Western Mediterranean	**7**	**5**	**1**	**1**	**3**	**17**
% Total Western	38%	31%	7%	8%	17%	100%
% Mediterranean Sea	7%	6%	16%	9%	31%	8%
Mediterranean Sea	**89**	**91**	**8**	**16**	**9**	**213**

All data have been extracted from UNCTAD, and correspond to year 2013. Only Mediterranean façades.

- **Freight transport and passenger flow**

The container transport and exchange in the sub-region amounts to 14 million TEU, which represents around 40% of container throughput in the Mediterranean region. Italy accounts for 45% of total container traffic in the sub-region, followed by Spain (39%). France accounts for 11% of container throughput while, in the southern Mediterranean shores, Algeria, Morocco and Tunisia together represent 5%. In Morocco, the Port of Tanger-Med has recently experienced an increase in container traffic and can now host container vessels of latest generation; it currently represents 2% of container flow in the sub-region yet a growth in port activities is expected in the coming years. Algeria also accounts for 2% of traffic in the sub-region, although container flows have been in constant increase since 2004.

Transport of goods amounts to circa 700 million tons in the Western Mediterranean and represents more than 40% of total transport in the Mediterranean region. Spain accounts for 38% of the freight transport in the sub-region, closely followed by Italy (28%) and Algeria (17%).

Table 73. Freight, container and passenger transport in the Western Mediterranean sub-region

	Western Mediterranean	Mediterranean Sea	% Sub-region
Container transport (in Million TEU)**	**14**	34	**42%**
Freight transport (in 000 tons)*	**677 392**	1 632 340	**41%**
Passenger transport (in 000s)*	**49 736**	171 113	**29%**

* Data from to 2009-2010. Eurostat EU Member States and Eurostat SEMC.
**World Bank, data from 2011.
Only Mediterranean façades.

Regarding passenger's traffic, 50 million passengers are registered in the Western Mediterranean, accounting for 30% of total passengers travelling within the Mediterranean region. Italian ports have registered the highest passenger flows in the sub-region, accounting on its own for 65%.

Economic and Social Analysis

The maritime transport's revenue in the Western Mediterranean sub-region is estimated to amount close to 40 billion Euros and to generate over 12 billion Euros of gross value added, a significant proportion of total Mediterranean numbers. In addition, it is estimated that this sector provides more than 270 000 direct jobs, a third of total jobs created by maritime transport activities in the Mediterranean Sea.

Table 74. Socioeconomic impacts of maritime transport in the Western Mediterranean sub-region

Region	Turnover (million EUR)	GVA (million EUR)	Employment (N direct jobs)
Western Mediterranean	**37 880**	**12 394**	**230 144**
% Mediterranean Sea	54%	46%	42%
Mediterranean Sea	**70 315**	**26 802**	**550 622**

NACE Rev. 2., Eurostat for: France and Spain. Values correspond to year 2010; when no updated or not available, values for 2009 were considered.
UNWTO, for Morocco. Values correspond to year 2011.

No data sources have been found for Algeria. Only Mediterranean façades.

Adriatic Sea

The Adriatic Sea is surrounded by Albania, Bosnia and Herzegovina, Croatia, eastern Italy, Montenegro and Slovenia.

Sector analysis

- **Ports**

The Adriatic Sea sub-region accounts for around 120 ports, which are located in the eastern-Italian, Slovenian, Croatian, Montenegro and Albanian coasts. They account for 20% of total ports of the Mediterranean Sea.

- **The merchant fleet in the Adriatic Sea**

The total merchant fleet registered in countries surrounding the Adriatic Sea amounts to almost 650 vessels, 8% of the total merchant fleet registered in the Mediterranean Sea (Table 75). The Italian and Croatian fleets together account for 86% of the total sub-regional figures (45% and 41% respectively) while Albania, Montenegro and Slovenia together represent the remaining 14%.

Table 75. The merchant fleet in the Adriatic Sea sub-region

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total Fleet
Adriatic Sea	**56**	**43**	**150**	**4**	**386**	**640**
% Total Adriatic	9%	7%	24%	1%	60%	100%
% Mediterranean Sea	4%	3%	10%	1%	11%	8%
Mediterranean Sea	**1 387**	**1 291**	**1 556**	**426**	**3 386**	**8 045**

All data have been extracted from UNCTAD, and correspond to year 2013. No data is reported for Bosnia and Herzegovina. Only Mediterranean façades.

Regarding the categorisation of the merchant fleet, and as for the Western Mediterranean, two thirds of the recorded vessels fall into the "other types" category. Noteworthy is the presence of cargo vessels, oil tankers and bulk carriers, which account at least for 40% of the total fleet in the Adriatic Sea.

Besides, the merchant fleet in the Adriatic Sea accounts for 3% in terms of deadweight tonnage (Table 76). Oil tankers and bulk carriers together account for almost 70% of the carrying capacity in the Adriatic Sea, while the "other type of ships" -which make up the bulk of the fleet- represent 20% of the sub-regional carrying capacity.

Table 76. Deadweight tonnage of merchant fleet in the Adriatic Sea sub-region (Million Tons)

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total fleet
Adriatic Sea	**3**	**3**	**0 (0,45)**	**0 (0,18)**	**0 (0,47)**	**6**
% Total Adriatic Sea	41%	42%	7%	3%	7%	100%
% Mediterranean Sea	3%	3%	6%	1%	5%	3%
Mediterranean Sea	**89**	**91**	**8**	**16**	**9**	**213**

All data have been extracted from UNCTAD, and correspond to year 2013. No data is reported for Bosnia and Herzegovina. Only Mediterranean façades.

- **Freight transport and passenger flow**

Container traffic in the Adriatic Sea amounts to 3 million TEU in 2011, the lowest value among Mediterranean sub-regions, which represents only 8% of container throughput in the Mediterranean region.

Italy is the main contributor by far in terms of container traffic in the sub-region, representing more than 70% of total flows. Slovenia, the second contributor in the Adriatic Sea, represents 22% of traffic, while Albania and Croatia together account for 8%.

Table 77. Freight, container and passenger transport in the Adriatic Sea sub-region

	Adriatic Sea	Mediterranean Sea	% Sub-region
Container transport (in Million TEU)**	**3**	34	**8%**
Freight transport (in 000 tons)*	**203 779**	1 632 340	**12%**
Passenger transport (in 000s)*	**17 389**	171 113	**10%**

* Data from to 2009-2010. EUROSTAT EU Member States and EUROSTAT SEMC.
**World Bank, data from 2011.
Only Mediterranean façades.

Both freight and passenger transport in the Adriatic Sea account for a modest 10% of values recorded at the regional basin (Table 77). Regarding freight transport, Italy represents 94% of total numbers, while Croatia and Slovenia account for the remaining 16%, both registering similar numbers. In contrast, regarding passenger flows, Croatia accounts for almost 80% while Italy represents over 20% (no data is reported for Slovenia).

Economic and Social Analysis

The maritime transport sector in the Adriatic Sea generates revenues amounting close to 10 billion Euros, as well as a GVA of just over 3 billion Euros. Both numbers account for around 12% of the regional values registered. In addition, it is estimated that more than 80 000 jobs are created by this sector in the Adriatic Sea, 15% of total maritime transport jobs in the Mediterranean Sea (Table 78).

Table 78. Socioeconomic impacts of maritime transport in the Adriatic Sea sub-region

Region	Turnover (million EUR)	GVA (million EUR)	Employment N direct jobs
Adriatic Sea	**9 215**	**3 269**	**81 220**
% Mediterranean Sea	13%	12%	15%
Mediterranean Sea	**70 315**	**26 802**	**550 622**

NACE Rev. 2., Eurostat for: Croatia, Italy and Slovenia. Values correspond to year 2009 and 2010.
UNWTO, for: Albania, Bosnia and Herzegovina and Montenegro. Values correspond to years 2010 and 2011.
Only Mediterranean façades.

Ionian Sea and Central Mediterranean

The Ionian Sea and Central Mediterranean is surrounded by southern Italy, Libya, Malta, Tunisia as well as eastern Greece.

Sector Analysis

- **Ports**

The Ionian Sea and Central Mediterranean Sea sub-region accounts for a total of 100 ports, which are located in Greek, Italian, Libyan, Maltese and Tunisian coasts, and account for 16% of total ports of the Mediterranean Sea.

- **The merchant fleet in the Ionian Sea and Central Mediterranean**

According to UNCTAD, the total merchant fleet in the Ionian Sea and Central Mediterranean registers 2 350 vessels, which also account for 30% of total merchant ships in the Mediterranean Sea. The Maltese

fleet constitutes the bulk of the sub-regional fleet, accounting for more than 75%, followed by far by Italy (11%) and Greece (7%). Libya and Tunisia together represent a discreet remaining 7%. Cargo vessels, oil tankers, and bulk carriers account for two thirds of the total fleet in this sub-region (Table 79).

Table 79. Merchant fleet in the Ionian Sea and Central Mediterranean sub-region

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total Fleet
Ionian Sea and Central Med	**515**	**589**	**462**	**121**	**665**	**2 352**
% Ionian Sea and Central Med	22%	25%	20%	5%	28%	100%
% Mediterranean Sea	37%	46%	30%	29%	20%	29%
Mediterranean Sea	**1 387**	**1 291**	**1 556**	**426**	**3 386**	**8 045**

All data have been extracted from UNCTAD, and correspond to year 2013. Only Mediterranean façades.

The Ionian Sea and Central Mediterranean's merchant fleet accounts for 40% of total carrying capacity in the Mediterranean basin. Again, oil tankers and bulk carriers together account for 85% of the sub-regional capacity (Table 80).

Table 80. Deadweight tonnage of merchant fleet in the Ionian Sea and Central Mediterranean (Million Tons)

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total fleet
Ionian Sea and Central Med	**32**	**38**	**3**	**6**	**4**	**82**
% Ionian Sea and Central Med	39%	46%	3%	7%	4%	100%
% Mediterranean Sea	36%	42%	37%	37%	38%	39%
Mediterranean Sea	**89**	**91**	**8**	**16**	**9**	**213**

All data have been extracted from UNCTAD, and correspond to year 2013. Only Mediterranean façades.

- **Freight transport and passenger flow**

Container traffic in the Ionian Sea and Central Mediterranean amounts to 5 million TEU which accounts for 15% of container throughput in the Mediterranean region. Malta and Italy are largely the main contributors in terms of container traffic in the sub-region, representing respectively 50% and 34% of total traffic in the sub-region. More than 300 000 TEU exchanged in Tunisian ports represent 7% of total container throughput in this sub-region, while Libyan exchanges account for 9%. Freight transport in the Ionian Sea and Central Mediterranean accounts for a discreet 9% of total regional values (Table 81). Italy represents more than 80% of total freight transport, followed far behind by Tunisia (11%). Greece and Malta register modest numbers for freight transport in this sub-region, accounting for 6% and 2% respectively.

In contrast, regarding passenger traffic one fifth of total Mediterranean flows are recorded in the Ionian Sea and Central Mediterranean. Passenger flows recorded in Italian and Greek ports account for 86% of the total passenger traffic registered in the sub-region.

Table 81. Freight, container and passenger transport in the Ionian Sea and Central Mediterranean sub-region

	Ionian Sea and Central Med	Mediterranean Sea	% Sub-region
Container transport (in Million TEU)**	**5**	34	**15%**
Freight transport (in 000 tons)*	**147 789**	1 632 340	**9%**
Passenger transport (in 000s)*	**34 116**	171 113	**20%**

* Data from to 2009-2010. Eurostat EU Member States and Eurostat SEMC..
**World Bank, data from 2011.
Only Mediterranean façades.

Economic and Social Analysis

The analysis of the economic and social data in the Ionian Sea and Central Mediterranean show the lowest results in terms of revenues, GVA and employment of maritime transport sub-sectors among Mediterranean sub-basins (Table 82). A turnover of more than 7 000 million Euros generates close to 3 million Euros GVA, while the maritime transport activities account for directly 54 000 jobs, all three results representing 10% of the Mediterranean figures.

Table 82. Socioeconomic impacts of maritime transport in the Ionian Sea and Central Mediterranean sub-region

Region	Turnover (million EUR)	GVA (million EUR)	Employment N direct jobs
Ionian Sea and Central Med	**7 335**	**2 757**	**54 074**
% Mediterranean Sea	10%	10%	10%
Mediterranean Sea	**70 315**	**26 802**	**550 622**

NACE Rev. 2., Eurostat for: Greece and Italy. Values correspond to year 2009 and 2010.
UNWTO, for: Malta and Tunisia. Values correspond to years 2010 and 2011.
Libya excluded (no data found). Only Mediterranean façades.

Even if no official, reliable data has been found for Libya, this country may have a significant maritime transport sector on account of the total registered oil and gas exports towards the north and west Mediterranean countries, as well as regarding the several well-equipped ports of the country (7 commercial ports, 7 petroleum ports, 2 mixed ports and a port for the steel industry, together with several smaller ports). Libyan ports are fully-equipped, as the government has well-invested in recent years. Libya's economy is dominated by the oil industry, which is owned by the State, other major production industries being natural gas, gypsum, steel, iron, food products, textile and cement. Its largest export markets are located northwards: Italy, Germany, Spain and France (Cetmo, 2010).

Aegean-Levantine Sea

The Aegean-Levantine Sea covers the eastern part of the Mediterranean and is surrounded by Cyprus, Egypt, Greece, Israel, Lebanon, Palestine, Syria and Turkey.

Sector Analysis

- **Ports**

The Aegean-Levantine Sea sub-region accounts for circa 200 ports located in Cyprus, Egypt, Greece, Israel, Lebanon, Syria and Turkey. As for the Western Mediterranean, they account for a third of the basin total ports. Some of the Mediterranean top ports are located in this sub-region (Piraeus-Greece, Haifa and Ahsdod– Israel, Alexandria and El-Dekheila, Port Said- Egypt) (Table 67).

- **The merchant fleet in the Aegean-Levantine Sea**

According to UNCTAD, the total merchant fleet registered in the Aegean-Levantine Sea amounts to 3 500 vessels, 44% of the total merchant fleet in the Mediterranean Sea. The Greek fleet represents close to 40% of the sub-regional fleet and together with the Turkish and Cyprus ones account for 90% of total registered vessels in the sub-region (Table 83).

Table 83. Merchant fleet in the Aegean-Levantine Sea sub-region

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total Fleet
Aegean-Levantine Sea	**655**	**590**	**784**	**275**	**1 256**	**3 560**
% Aegean-Levantine Sea	18%	17%	22%	8%	35%	100%
% Mediterranean Sea	47%	46%	50%	65%	37%	44%
Mediterranean Sea	**1 387**	**1 291**	**1 556**	**426**	**3 386**	**8 045**

All data have been extracted from UNCTAD, and correspond to year 2013. No data found for Palestine. Only Mediterranean façades.

More than one third of the registered vessels are categorised as "other type". General cargo vessels account for more than one fifth of the fleet, and, together with oil tankers and bulk carriers, they represent 50% of the total merchant fleet in the area.

The merchant fleet registered in the Aegean-Levantine Sea also accounts for 50% of the total carrying capacity, in terms of DWT (Table 84). Oil tankers and bulk carriers together total almost 90% of the total capacity in the sub-region.

Table 84. Deadweight tonnage of merchant fleet in the Aegean-Levantine Sea sub-region (Million Tons)

Region	Oil tankers	Bulk carriers	General cargo	Container ships	Other types of ships	Total fleet
Aegean-Levantine Sea	**48**	**45**	**3**	**8**	**2**	**107**
% Aegean-Levantine Sea	45%	42%	3%	8%	2%	100%
% Mediterranean Sea	54%	49%	40%	53%	26%	50%
Mediterranean Sea	**89**	**91**	**8**	**16**	**9**	**213**

All data have been extracted from UNCTAD, and correspond to year 2013. No data for Palestine. Only Mediterranean façades.

- **Freight transport and passenger flow**

Significant figures are recorded in the sub-region regarding container, freight and passenger transport (Table 85).

Container traffic amounts to 12 million TEU, which represents around 35% of container throughput in the Mediterranean region. Turkey accounts for 32% of total container traffic in the Aegean-Levantine Sea, while Israel (19%), Egypt (17%) and Greece (14%) record similar figures and together account for 50% of container throughput. Lebanon, Syria and Cyprus represent the remaining 18% of total flows in the sub-region.

Both freight transport and passenger flows account for 40% of regional numbers. Turkey and Greece account for close to 85% of total freight transport. Modest figures characterize freight transport in Egypt (7%), Israel (6%) as well as in Cyprus and Lebanon (1%).

On the other hand, Greece makes up the bulk of passenger flows in the Aegean-Levantine Sea, accounting for 95% of total passengers registered in the sub-region.

Table 85. Freight, container and passenger transport in the Aegean-Levantine Sea

	Aegean-Levantine Sea	Mediterranean Sea	% Sub-region
Container transport (in Million TEU)**	**12**	34	**35%**
Freight transport (in 000 tons)*	**603 379**	1 632 340	**37%**
Passenger transport (in 000s)*	**69 872**	171 113	**41%**

* Data from to 2009-2010. Eurostat EU Member States and Eurostat SEMC.
**World Bank, data from 2011.
Only Mediterranean façades.

Economic and Social Analysis

The maritime transport sector in the Aegean-Levantine Sea generates estimated revenues amounting to 16 billion Euros, as well as a gross value added of 8 billion Euros. In addition, it is estimated that more than 185 000 jobs are held by this sector in the Aegean-Levantine Sea sub-region, one third of total jobs provided by this sector in the Mediterranean Sea.

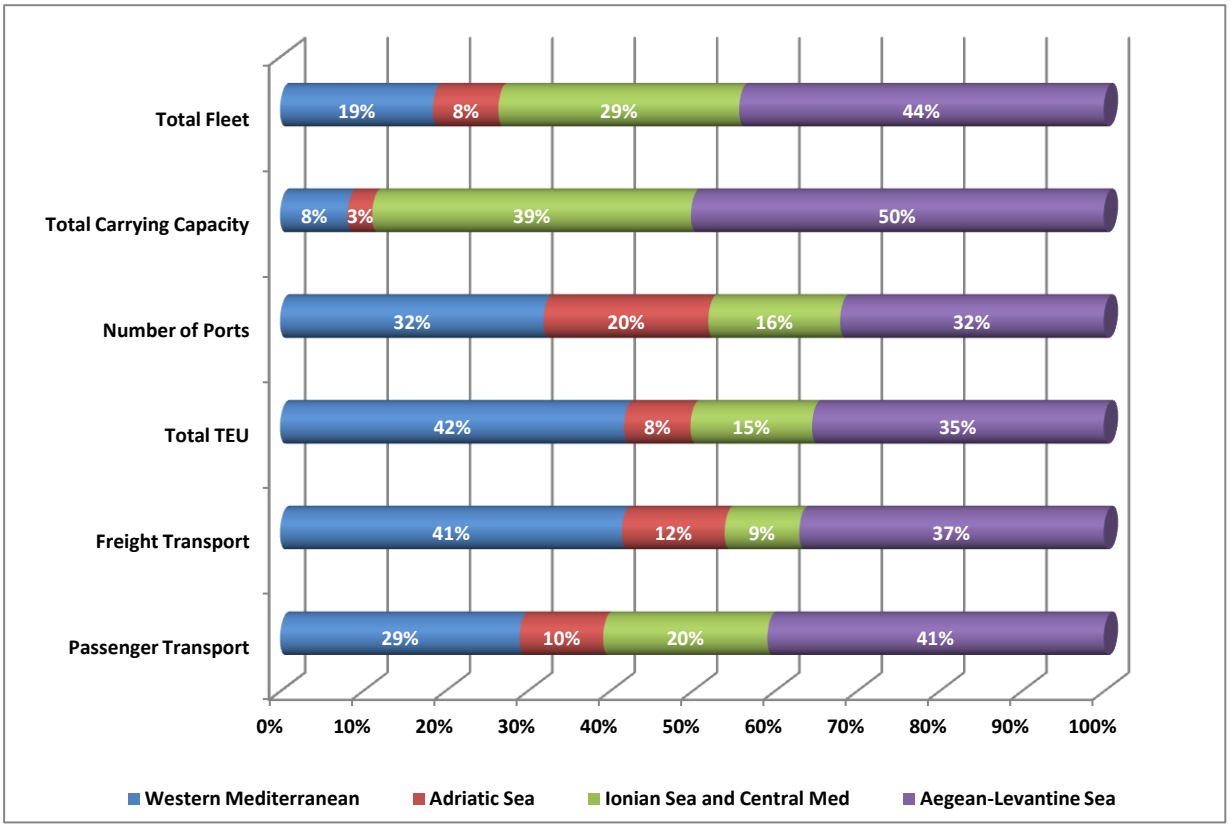
Table 86. Socioeconomic impacts of maritime transport in the Aegean-Levantine Sea

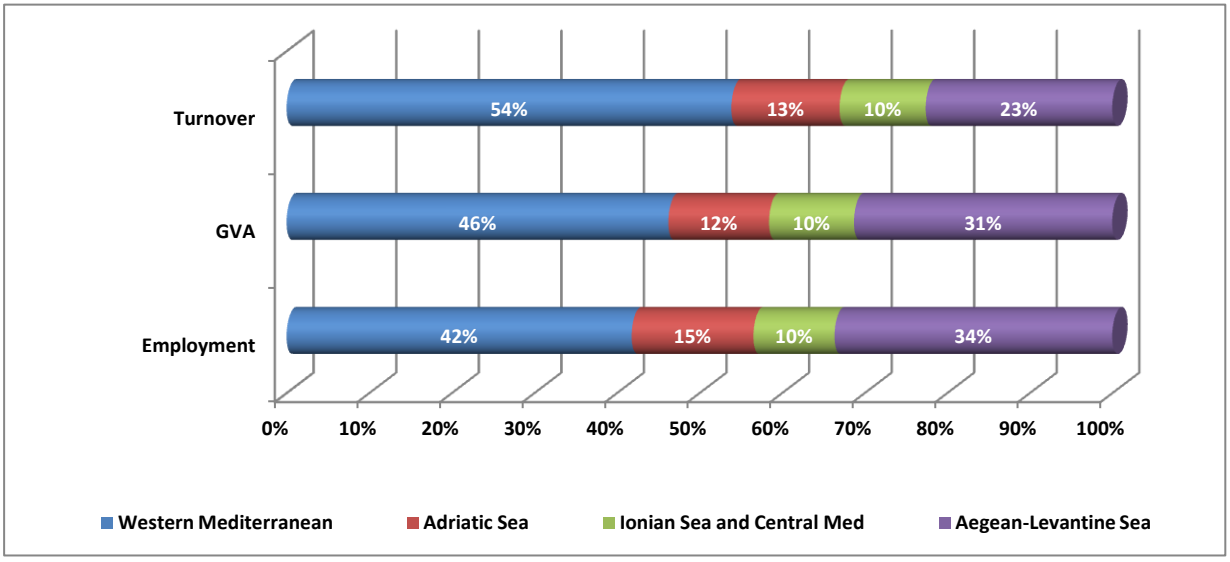
Region	Turnover (million EUR)	GVA (million EUR)	Employment N direct jobs
Aegean-Levantine Sea	**15 885**	**8 382**	**185 184**
% Mediterranean Sea	23%	31%	34%
Mediterranean Sea	**70 315**	**26 802**	**550 622**

NACE Rev. 2., Eurostat for: Cyprus, Greece and Turkey. Values correspond to year 2010; when data had not been updated or were not available, values for 2009 were taken. UNWTO, for: Egypt, Israel. Values correspond to years 2010 and 2011.
No data sources have been found for Lebanon, Palestine and Syria. Only Mediterranean façades.

3.4.5 Overview of maritime transport in the in the Mediterranean sub- regions

The following figures summarize main sector, economic and social indicators characterizing the maritime transport sector among the different Mediterranean sub-regions considered in the assessment:





3.4.6 Perspectives and future trends of the maritime transport sector in the Mediterranean region

The maritime transport sector in the Mediterranean Sea was well-developed before the 2009 financial crisis and, even though it was affected by it, it tends to recover rapidly.

It is expected that shipping routes in the Mediterranean basin increase in the following years, both in number and traffic intensity. The future development of new export routes for crude oil from the Caspian region, the development of new pipelines bypassing the Bosporus and the expansion of current pipeline capacity is likely to result in a significant increase in the density of tanker deployment in the eastern Mediterranean (IMO).

North European demand for energy is likely to be answered by an increase in LNG transits via the Mediterranean from gas fields in the Persian Gulf and the Far East. In addition, if planned LNG terminal developments take place, the density of LNG tanker deployment around the Italian coastline will increase significantly. Although the relative importance of eastern Mediterranean ports will rise, the greatest level of vessel activity will continue to be concentrated around western and central Mediterranean ports (Lloyd's MIU, 2008).

According to a prospective study conducted by Plan Bleu (2010) relating non-bulk transport of goods (which reported the highest grow over the last decade), the future of this activity may depend upon factors such as economic growth, the price of energy and CO_2 and the various transport policies integrating infrastructures, that is, the use of equipment, commercialisation and regulation. In conclusion, the prospective study came up with three hypothetical scenarios and involved their analysis and comparison with the baseline situation (2005).

The first scenario (S1) corresponds to a low economic growth situation (1.5% in the North and 3% in the South of the Mediterranean region) together with an oil barrel at USD 50. Transport policy is limited to a few public investments in roads and port modernisation driven by the private sector. The road transport sector remains poorly organised, little concentrated and marked by intense competition.

The second scenario (S2) corresponds to the pre-2008/2009 crisis situation, with a steadier economic growth (1.8% in the North and 4 % in the South) and an oil barrel price fixed at USD 100 (value of 2005). Transport-related measures help achieving economies of scale thanks to a mass effect in the handling of goods. Investments seek the improvement of road connections with ports and logistic platforms. The logistic chain takes place with the coming on board of leading international players.

The last scenario (S3) shows a more dynamic growth (2.1% in the North and 5 % in the South) granting the actors room for engaging significant port investments. Public players may take proactive actions, in terms of development of railway transport (connection to ports, logistic platforms, and institutional reforms). Leading groups hold control over logistic chains. Several sea motorways emerge. The oil barrel stands at USD 150 and the price of a ton of CO_2 is USD 100.

It is important to highlight that, in all cases, the shipping industry in the Mediterranean Sea is expected to grow during the following decades. In addition, in the three scenarios considered, Asia remains by far the major trade partner and hence the main source of non-bulk transport. Even in the S3 case—which rests on the hypothesis of significant port investments—intra-Mediterranean exchanges are expected to remain quite low compared to exchanges with Asia, and the status of the Mediterranean as a "transit sea" is not altered. However, the last scenario reveals that a good connection of the ports with land-based transportation networks would allow multiplying railway traffic five-fold and road traffic two-fold. This capture of road traffic—made possible by proactive policies, and prompted by high oil and CO_2 prices—mitigates the saturation of port cities and facilitates the transit of goods.

On the other hand, it has been also stated that maritime transport might be barely impacted by fuel or carbon prices since it is possible to keep control over operation costs thanks to ship size, ship speed

reduction and the professionalization of the logistic chains that facilitate access to the Asian production system.

3.4.7 Environmental pressures of maritime transport

Impacts of Maritime Transport have been synthetized in Table 87 according to relevant EcAp EOs.

An enclosed sea such as the Mediterranean is particularly vulnerable to ship-associated impacts, resulting of a high-volume of shipping routes, long history of use, and sensitive shallow and deep-sea habitats. Since these values are expected to grow three or four-fold in the next 20 years (Abdulla and Linden, 2008), it is reasonable to predict that there might be an intensification of maritime-associated impacts on marine biodiversity, which are also expected to grow at an alarming rate. These impacts are due to ship pollution (i.e. emissions and leaks), collisions and noise, grounding and anchor damage, and transportation of non-indigenous species.

Globally, maritime transport accounts for 10% of human sources of marine pollution (according to 2002 data and estimates) while land-based sources together with atmospheric inputs from land industry sources contribute 80% to marine pollution generated from human activities (IMO, 2012).

As mentioned above, marine pollution –in particular, oil pollution- entering the marine environment is one of the main shipping pressures. From the available data, it is considered that the Mediterranean Sea is more polluted by oil than any other sea (Abdulla and Linden, 2008). Data on the total discharges resulting from such maritime traffic are particularly scarce, yet around 360 million tons of oil and refined products are estimated to cross the Mediterranean every year. Of these, close to 400 000 tons are deliberately dumped every year into this basin, driven by routine ship operations (oil tankers, but also cargo ships, fishing boats, leisure craft and naval vessels) which are regarded as the main source of oil pollution in the Mediterranean, posing an acute, long-term threat to marine and coastal ecosystems (UNEP, 2006).

Cetaceans, seals and other fish species are affected not only by chemical pollution but also by noise. Noise has become a ubiquitous form of marine pollution, in particular in areas of heavy maritime traffic and along developed coasts. General ship traffic generally does not generate very intense noise, but the acoustic pollution produced is constant over time and affects large areas because sound propagates very well even over long distances in the marine environment, especially when frequencies are low or the sound is channelled by pressure and temperature gradients. It may be a serious hazard not only to individual animals, but also to entire populations.

The shipping industry is a relatively small contributor to the total volume of atmospheric emissions (mainly NOx, SOx, particulate matter and CO_2) compared to road vehicles and public utilities, such as power stations. Atmospheric pollution from ships has been reduced in the last decade mainly due to significant improvements in engine efficiency. Improved hull design and the use of ships with larger cargo carrying capacities have also led to a reduction in emissions and an increase in fuel efficiency. However progresses are still technically possible, especially when vessel are in operation at quay, and are being promoted by European authorities.

Ship hulls need to be kept smooth from marine growth to ensure maximum performance and full efficiency. In the past, many of the coatings used were themselves harmful to the marine environment and more benign coatings are needed to be developed to replace them. IMO's International Convention on the Control of Harmful Anti-fouling Systems on Ships came into force in 2008. The Convention prohibits the use of harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.

Vessels need to carry ballast waters to keep them stable in water. Taking on ballast water and discharging it must be carefully controlled as these operations may contribute to spread non-indigenous species, which is one of the major impacts of maritime transport activities, and introduce invasive species

into an environment where they can overrun natural local species. It is estimated that at least 7 000 different species are being carried in ballast tanks around the world (IMO, 2012).

Table 87. Environmental impacts of maritime transport in the Mediterranean Sea. Impacts have been aggregated according to EcAp's Ecological Objectives

EOS - ECOLOGICAL OBJECTIVES		DESCRIPTION OF IMPACTS OF MARITIME TRANSPORT
EO1	Biological diversity	Collisions with marine mammals and turtles Antifouling biocide effects on marine fauna Oil/ pollutant toxic effects on marine organisms/ top predators Effects of litter in marine organisms
EO2	Non-indigenous species	Ballast waters Fouling
EO5	Eutrophication	Sewage discharge (non-treated used waters)
EO6	Sea-floor	Direct physical effects of vessels on benthic habitats and species Abrasion.
EO9	Contaminants	Oil pollution (releases/ discharges), eventual or chronic Shipping-derived antifouling biocides
EO10	Marine litter	Littering, waste discharge
EO11	Noise	Shipping noise: damage, disturbance to/of marine mammals and fish

Despite several managerial actions taken nationally and internationally, the situation with regard to marine litter is continuously getting worse according to the United Nations Environmental Programme (UNEP, 2005). In this sense, the enforcement of when and where to dispose of all types of wastes produced on a ship's voyage has become better regulated through MARPOL Annex V (Garbage). The most important feature of the Annex is the complete ban imposed on the dumping into the sea of all forms of plastic. However, although the Annex obliges Governments to ensure adequate provision of facilities at all ports and terminals for the reception of garbage, more work needs to be done to ensure their availability in all ports. IMO has also embarked on a process to review Annex V and the associated guidelines for its implementation, bringing in new technological developments made by the shipping industry.

There are no recent and certain figures on the amounts and inputs of marine litter worldwide, nor to the marine and coastal environments. In 1997, it was estimated that the total input of litter into the oceans, worldwide, was approximately 6.4 million tons per year. Other calculations estimated some 8 million items of marine litter entering oceans and seas every day, 5 million of which are thrown overboard or lost from ships. Furthermore, it has been estimated that over 13 000 pieces of plastic litter are floating on every square kilometre of ocean surface (IMO, 2012).

3.4.8 Data gap analysis

According to the analysis conducted, sector and socioeconomic data on maritime transport activities are detailed and available for the majority of EU Mediterranean countries at least at the national scale, and for some indicators also at sub-national levels.

However, for Mediterranean non-EU countries, sector data is aggregated at the national scale or unavailable, thus not allowing its characterisation by maritime façades. In some cases, socioeconomic information is not publicly available and has been estimated by means of approximate ratios and assumptions, which may have led to the over/underestimation of the sub-regional results.

3.5 OFFSHORE OIL AND GAS EXTRACTION

3.5.1 Introduction

General context

The general context of oil and gas reserves (onshore and offshore) in the Mediterranean was presented by OME in its last review on Mediterranean energy perspective (OME, 2011). In 2011, the

Mediterranean region's proven oil reserves was 67 billion barrels (9 400 million of toe[16]), 4.6% of the world's proven oil reserves. Three countries – Libya, Algeria, and Egypt – hold 94% of the Mediterranean's proven oil reserves. Libya alone accounts for 69%. Most of the Mediterranean countries have been relatively well explored for hydrocarbons. However, many areas in the South Mediterranean, especially offshore, still remain either unexplored or under-explored. Regarding gas, the Mediterranean region had in 2010 4.7% of global natural gas reserves. In 2010, Algeria, Libya and Egypt held more than 92% of the region's total natural gas reserves. Algeria's share was 50%, yet the country is largely under-explored. In Egypt, natural gas reserves are on the rise and there are still untested areas to be explored.

Current offshore production in the Mediterranean is concentrated in waters of Egypt, Libya, Tunisia, Italy, and to a lesser extend Israel, Croatia and Spain, but other areas are promising, such as offshore of the Levantine coasts (Greece, Lebanon and Cyprus).

Activity description

The oil and gas activities considered in this section include offshore exploration and extraction of oil and gas in coastal and deep waters. Offshore activities comprise different phases linked to exploration of oil and gas reservoirs: i) the exploration phase to probe the position and the geological characteristics of wells, ii) the installation of the production platform iii) the production phase to extract oil and gas and iv) the decommissioning phase when the commercial life of the well is finished (E & P Forum / UNEP, 1997).

Offshore activities are supported by service activities, such as supplies to offshore platforms (various materials, food), personnel transport, security of platforms, anti-pollution but also towing, installation and maintenance of platforms. In this study, these support activities are not taken into account in the calculation of turnover and gross value added, but they might have been included in the employment data issued by some consulted sources.

3.5.2 Methods, data and assumptions

Data on offshore hydrocarbon production in the Mediterranean Sea are scarce. Oil and gas offshore production is not an economic sector by itself, but a subsector of the oil and gas production in general. Moreover, the produced commodities (crude oil, natural gas) that are statistically recorded are identical to those produced on land, the only difference being on the means of exploration and production. Data used and assumptions developed to address the sector economic and social analysis are presented in the regional analysis section.

Considering the data available, 2011 has been selected as reference year for this analysis.

Sector Analysis

Sector analysis is mainly based on offshore production figures. As further developed in the data analysis section, offshore production figures are generally not freely available, with some exceptions (Italy). Some standard assumptions have thus been made to estimate offshore production from national primary production.

- National primary productions (offshore and onshore aggregated) of oil and gas are taken from Eurostat for EU countries and from the BP Statistical Review of World Energy (BP, 2013) for non-EU producing countries.
- For Italy, the National Statistical Data (DG RME, 2013) provides a detailed overview of the Italian offshore production, giving information on production and installation.

[16] tonne of oil equivalent (toe)

- Clarkson Research Services provides offshore production figures (quantities, number of fields, platforms…), mostly on crude oil and less on natural gas, regarding some countries. The December 2010 issue has been used.
- When offshore production figures were not available, it has been estimated that approx. 50% of the primary production of crude oil or natural gas is produced offshore. This rough assumption has been used by the EU Offshore Authorities group to present the offshore oil and gas production in Europe by countries.
- Crude oil and gas production are segregated. Oil and gas productions, generally in barrels per day and in cubic meters respectively, have both been converted in toe using approximate conversion factors given in BP, 2013.
- Otherwise stated, International System of Units for metric prefix is used: kilo (k) for 1000, Mega (M) for 1000^2, Giga (G) for 1000^3.

Economic Analysis

The indicators for the economic analysis are the production value and the gross value added of the sector. Turnover is not available, but it is reasonable to think that all the production is sold, or virtually sold in case of direct consumption, variations in storage being limited.

Production value

- It has been considered that all the productions identified have been sold at the average price of the "Brent dated", as given in the BP Statistical Review of World Energy (2013), in USD 2011. For the reference year, one barrel of crude oil was valued USD 113.56 or USD 795 for one toe of oil. The same source provides also the average price of natural gas for the year 2011 and per million of British thermal units (Btu): USD 10.48. Conversion gives USD 428 per toe of gas. Difference is explained by the fact that oil is easier to transport than gas.
- Conversion USD / Euro has been made using the yearly average conversion rate for the reference year: one USD for 0.78 Euro. So, one crude oil toe was valued at 582 Euros and one natural gas toe at 307 Euros.

Gross value added

- Offshore and onshore productions are generally aggregated in macro-economic statistics and few studies specific to offshore activities are freely available (Pugh, 2008). None have been found regarding specifically Mediterranean countries. Thus the average UK GVA/production value ratio of 69% has been used for Mediterranean offshore oil and gas extraction.

Social Analysis

As for the GVA, specific studies on the employment induced by the oil and gas offshore industry within Mediterranean countries have not been found. Figures transferred from the UK offshore industry have been used (UK Offshore industry, 2013), assuming that each tonne oil equivalent generates the same ratio of employment in Mediterranean countries as in the UK industry. Considering the large difference in national importance between the UK offshore industry and the one of the Mediterranean countries under study, this assumption probably underestimates direct employment but also overestimates indirect employment, thus providing the general order of magnitude on the whole.

In 2012, the UK oil and gas offshore production was about 100 000 ktoe. The same year, exploration and extraction of oil and gas from the UK continental shelf accounts for around 440 000 jobs, comprising:

- Direct: 32 000 directly employed by oil and gas companies and their major contractors (ratio: 0,32 job per produced toe)
- Indirect: 207 000 within the wider supply chain (ratio: 2,07 jobs per produced toe)

- Induced: 100 000 jobs supported by the economic activity induced by employees' spending, plus 100 000 jobs in the exports business, or 200 000 (ratio: 2,00 jobs per produced toe)
- Total 439 000 jobs including direct, indirect and induced jobs (ratio: 4,4 jobs per produced toe)

It should be noted that this assumption leads to a rather high ratio total / direct jobs (approx. 14) or, in other words, each direct job in this sector generates 13 indirect and induced jobs.

Direct relationship between production and jobs cannot be used for countries having low or no offshore production but making large exploratory or development efforts at sea. In the Mediterranean Sea, these are mainly the cases of Algeria and Israel. Algeria has launched several licencing rounds for exploratory campaigns, for which 100 direct jobs have been added. In Israel, intense multi-year exploratory campaigns have finally been successful, with the discovery of large deep gas fields in the Levantine Basin Province, Tamar and more recently Leviathan. During the reference year selected for this study (2011) Tamar was under development, representing a gross investment expected to be approximately of 3-3.5 billion USD in specialized web press. To take into account this development effort without direct production, Israeli direct employment for offshore oil and gas in 2011 has been estimated at around 1000 jobs and the GVA at approximately 500 million Euros for the year.

Data and calculations are presented in Appendix 2.

3.5.3 Sector and socioeconomic analysis for the Mediterranean regional area

This analysis is presented according to the same structure followed to assess the other sectors: sector analysis, giving indication on the importance of the production of this sector, here in terms of estimates of offshore oil and gas production in the Mediterranean area; economic analysis, presenting the assessment of the value of the offshore oil and gas production and the GVA of this activity; and social analysis, focusing on the generated employment (direct, indirect and induced). Indicators are displayed for the whole Mediterranean area, along with their distribution in each sub-region in percentage.

Pressures exerted by activities associated to the oil and gas offshore extraction on marine and coastal ecosystems are presented in the following sections, as well as the gap analysis in terms of data and knowledge.

Sector Analysis

- **Offshore oil production**

The offshore oil production in the Mediterranean Sea has been estimated to 19 million toe for the year 2011, or 12% of the total oil production for the same year in this region. This is below the world ratio, which was 30% in 2010 (Serbutoviez, 2012). Offshore oil production is concentrated in the Aegean-Levantine Sea, mostly in the Egyptian waters (Table 88).

Table 88. Estimated crude oil production, total and offshore, for the 2011 year in millions of toe, % of offshore oil production per sub-region

Total crude oil production, 2011 (Mtoe)	**157**
Offshore crude oil production, 2011 (Mtoe)	**19**
Western Mediterranean	1%
Adriatic Sea	7%
Ionian Sea and Central Mediterranean	17%
Aegean-Levantine Sea	76%

- **Natural gas production**

The natural gas production in the Mediterranean sea has been estimated to 68 million toe (more than 3 times the crude oil production), or 32% of the total gas production for the same year in this region. It is slightly over the world ratio, which was 27% in 2010 (Serbutoviez, 2012). Offshore gas production is mostly shared between the Ionian Sea and Central Mediterranean and the Aegean-Levantine Sea (Table 89), the share of which should increase in the coming years with the start of the Levant basin province production.

Table 89. Estimated natural gas production, total and offshore, for the 2011 year in millions of toe, % of offshore gas production per sub-region

Total natural gas production, 2011 (Mtoe)	**215**
Offshore natural gas production, 2011 (Mtoe)	**68**
Western Mediterranean	0,1%
Adriatic Sea	9%
Ionian Sea and Central Mediterranean	50%
Aegean-Levantine Sea	40%

Table 90 gives the sum of oil and gas production figures for the Mediterranean Sea.

Table 90. Estimated crude oil and gas production, total and offshore, for the 2011 year in millions of toe, % of offshore production per sub-region

Total oil & gas production, 2011 (Mtoe)	**372**
Offshore oil & gas production, 2011 (Mtoe)	**87**
Western Mediterranean	0,1%
Adriatic Sea	9%
Ionian Sea and Central Mediterranean	43%
Aegean-Levantine Sea	48%

- **Offshore fields and production units**

Other significant production indicators have been collected, such as the number of offshore fields identified in the Mediterranean Sea and the number of production units.

Clarkson (2013) counts 274 active fields, 20 under development and 170 as potential. Table 91 displays the number of fields per categories and per depth. It should be noted that 26 fields are between 500 and 1500 m and 5 are deeper than 1500 m.

Clarkson (2010) counts 380 active production units in the Mediterranean Sea. It should be noted that a detailed source of information (UNMIG, Italian Ministry for Economic Development) states that 120 production units lie in Italian waters, accounting for only 7% of the production. The regional figure is probably nowadays around 500 if submarine well platforms, intended to assist production, are added.

Table 91. Number of offshore fields in the Mediterranean Sea, per depth categories

Depth	Shallow		Intermediate	Deep	Ultra-deep	Total
	<100m	100-199m	200-499m	500-1500m	> 1500m	
	No.	No.	No.	No.	No.	No.
Active	238	23	4	9		274
Under Devt.	12	1	1	5	1	20
Potential	96	19	24	26	5	170

Source: Mediterranean Oil&Gas Fields Directory 2013, Clarkson Research services. Note: Tamar, 1700m, recorded as underdevelopment, is now in production since March 2013.

Economic Analysis

Indicators selected for the economic analysis are the value of the sector production and the GVA. Turnover is not available, but it is reasonable to think that all the production is sold, or virtually sold in case of direct consumption, variations in storage being limited.

- **Production value**

Table 92 provides an estimation of the value of the offshore oil and gas produced in the Mediterranean Sea, which amounts approximately to 32 billion Euros. This value should increase in the coming years. Repartition among sub-regions gives a clear advantage to the Aegean-Levantine Sea, due to the fact that one toe of gas is 40% cheaper than one toe of oil.

Table 92. Estimation of the value of the offshore oil and gas production for the year 2011, % of value per sub-region

Offshore oil & gas production value 2011 (Million Euros)	**32 067**
Western Mediterranean	0,2%
Adriatic Sea	8%
Ionian Sea and Central Mediterranean	38%
Aegean-Levantine Sea	54%

- **Gross value added**

Table 93 provides an estimation of the GVA of the offshore oil and gas production, according to the assumption presented above.

Table 93. Estimation of the gross value added of the offshore oil and gas production for the year 2011, % of value per sub-region

Oil & gas gross value added 2011 (€, millions)	**22 679**
Western Mediterranean	0,2%
Adriatic Sea	8%
Ionian Sea and Central Mediterranean	38%
Aegean-Levantine Sea	54%

Ratio "Production value/ gross value added" of 69% applied, transferred from UK values (Pugh, 2008).

Social Analysis

According to the strong assumptions previously detailed, Table 94 provides employment figures generated by this sector in the Mediterranean basin.

Table 94. Estimation of direct, indirect and induced employment of the oil and gas offshore extraction, % of total employment per subregion

Direct employment	**29 049**

Indirect employment	**187 908**
Induced employment	**181 554**
Total Employment	**398 510**
Western Mediterranean	0,5%
Adriatic Sea	8%
Ionian Sea and Central Mediterranean	41%
Aegean-Levantine Sea	50%

Ratio "Production volume/ employment" transferred from UK Offshore Industry (2013)

3.5.4 Sector and socioeconomic analysis for the Mediterranean sub-regional areas

Western Mediterranean

This area includes parts of the coasts and waters of Spain, France, Italy, Tunisia, Algeria and Morocco.

Algeria is currently the largest producer in the Mediterranean for oil and gas, production being currently only onshore. Algeria's offshore, where recent seismic surveys have been conducted, is considered a promising deep water frontier. To date, however, there are only a few exploration wells drilled and only one in deep waters. The state-owned company planned to start drilling offshore in 2011-2012 (OME, 2011).

There is only a small production zone in Spain, located south off the Ebro delta. According to Clarkson (2010) 6 fields are in production in Spain, a figure which remained stable from 2006 to 2010, while the production is slowly decreasing. 2011 production of crude oil was estimated at 120 ktoe.

Sector analysis

- Oil and gas production tonnage: 120 ktoe (in Spain), in 2011
- Number of production installations: 6 (in Spain)

Economic analysis

On the basis of international yearly averaged prices for oil and gas of the reference year (2011):

- Value: 65 million Euros

Assuming an average GVA / production value ratio equal to 69% (Pugh, 2008):

- GVA: 45 million Euros

Social analysis

Current permanent employment has been estimated according to the ratio derived from the UK offshore industry analysis:

- Direct employment: 100- 200 jobs, including employment involved in offshore exploration in Algeria
- Total employment : 1500 - 3000 jobs

Projections

Exploration licences on large and deep to ultra-deep areas have been granted both in France and in Spain. In France, south off Provençal coasts, Rhône Maritime, in the French former Mediterranean Environmental Protection Zone, a very large exploration licence (25 000 km²) going as deep as 2600 m was granted in 2002, renewed in 2006 for 125 km² and dropped in 2012. This licence has triggered anger of ecology movements, as it was located near the Pelagos cetacean sanctuary. Spain has recently granted a very large exploration licence in the slope of the Gulf of Lions shelf named Nordeste. It should be noted that a large part of this licence is located in an area belonging to the recent EEZs claimed both by France (2012) and Spain (2013). Exploration activities in Member State waters are facing

strong environmental opposition, due to their recognized ecological sensitivity, their seismic instability and their ultra-depth, making difficult implementation of control operations in case of problems. This opposition has been strengthened since the BP Deepwater Horizon accident in the Gulf of Mexico. Moreover, production in these areas would be very expensive. For these reasons, production would be probably delayed to 2030, if not dropped out.

The situation might be different in Algeria, where production could be triggered by the good results of the ongoing explorations, high energy prices and policies favourable to foreign investments.

Adriatic Sea

Sector analysis

This area includes parts of the coasts and waters of Italy, Croatia, Bosnia-Herzegovina, Montenegro and Albania.

The Italian west coast of the Adriatic Sea has long been subject to permanent production activities. Approximately one hundred platforms at sea, which extract mainly gas, are distributed along the Northern and Central Adriatic coast, at depths varying between 10 to 120 m. On the east part, Croatia is following the same pattern.

- Oil and gas production tonnage: 7 670 ktoe, in 2011
- Number of production platforms: approx. 150

Economic analysis

On the basis of international yearly averaged prices for oil and gas of the referenced year (2011):

- Value: 2 688 million Euros

Assuming an average GVA/ production value ratio equal to 69% (Pugh, 2008):

- GVA: 1 859 million Euros

Social analysis

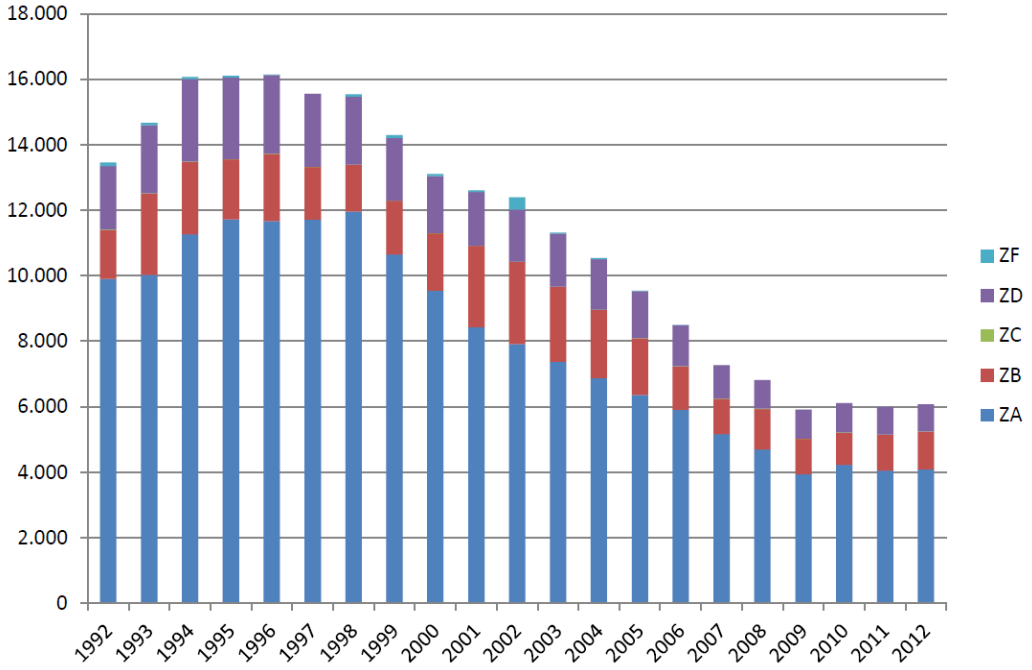
Current permanent employment has been estimated according to the ratio derived from the UK offshore industry analysis:

- Direct employment: 2 500 jobs
- Total employment: 34 000 jobs.

Projections

The Adriatic offshore fields are mature and their production will be declining in the coming years (Figure 6). In an optimistic scenario, the Italian RIE (2012) foresees a marginal increase of 0.75 toe/year for 2020 (+10%) if a large revamping program for the offshore platforms is rapidly implemented. Croatian production is stable and should also decline.

Figure 6. Offshore gas production in the Italian areas, years 1992-2012, in millions of m^3



Ionian Sea and Central Mediterranean

This area includes parts of the coasts and waters of Italy (Sicily), Albania, Greece, Libya, Tunisia and Malta.

Current offshore production mainly concerns Libya and Tunisia. Libya has the largest proven oil reserves in the Mediterranean region and some observers think that its reserve may be higher based on potential both in onshore and offshore sedimentary basins, of which large parts remain poorly explored. The offshore eastern Tripolitan Basin is mentioned in the list of the areas recognized to have exceptional potential for major undiscovered petroleum resources (OME, 2011).

Unlike its prolific oil producing neighbour, Algeria, Tunisia's upstream oil industry is modest. Offshore fields are located in the Gulf of Gabes.

It should be noted that Malta is a known flag state for mobile offshore fleet.

Sector analysis

Yearly production quantities of oil and gas (Libya and Tunisia) have been estimated for the reference year (2011):

- Oil: 3,3 million toe per year
- Gas: 34,2 million toe per year
- Total: 37,5 million toe per year

Economic analysis

On the basis of international yearly averaged prices for oil and gas of the reference year (2011):

- Value: 12 500 million Euros

Assuming an average GVA / production value ratio equal to 69% (Pugh, 2008):

- GVA: 8 500 million Euros

Social analysis

Current permanent employment has been estimated according to the ratio derived from the UK offshore industry analysis:

- Direct employment: 12 000 jobs
- Total employment: 165 000 jobs

Projections

It is assumed that the Libyan oil production will reach the pre-crisis level by late 2013 and its contribution to the Mediterranean oil production will increase strongly by 2030, barely offsetting the decline in all other Mediterranean countries. Its gas production will also increase during this period. The Libyan oil and gas reserves concern both onshore and offshore fields. However, the offshore part in these future productions is still unknown.

Tunisian offshore fields are mature and production will be progressively depleting.

Aegean-Levantine Sea

This area includes parts of the coasts and waters of Greece, Turkey, Cyprus, Syria, Lebanon, Israel, Palestine, Egypt and Libya.

In 2011, production concerned mainly Egypt in coastal waters (<200m), and to a lesser extend Israel and Greece. However the area is promising offshore Egypt and all along the Levantine coast in open waters. In 2009-2010 the world's largest deep water gas discoveries of the last decade have been identified in this area with the fields of Tamar and Leviathan situated offshore Israel in depths around 1500-1700m (OME, 2011).

In Egypt, natural reserves are on the rise and untested areas are still to be explored. A recent assessment identifies potentially extractable resources in the Nile Margin Reservoir, onshore and near-shore, and in the Nile Cone, in deep waters (OME, 2011).

Offshore production in Greece is very confidential. According to Clarkson (2010), 3 fields are believed to be in production in 2010, versus 71 in Italy, to give a comparison. Exploration is relatively recent and oil reserves were discovered in 1973 only in the north of the Aegean Sea. More promising discoveries are located in Western Peloponnese.

Sector analysis

Yearly production quantities of offshore oil and gas (Egypt and Greece) have been estimated for 2011:

- Oil: 14,5 million toe
- Gas: 27,5 million toe
- Total: 42 million toe

Economic analysis

On the basis of international yearly averaged prices for oil and gas of the reference year (2011):

- Value: 16 900 million Euros

Assuming an average GVA/ production value ratio equal to 69% (Pugh, 2008):

- GVA: 12 200 million Euros

Social analysis

Current permanent employment area has been estimated according to the ratio derived from the UK offshore industry analysis:

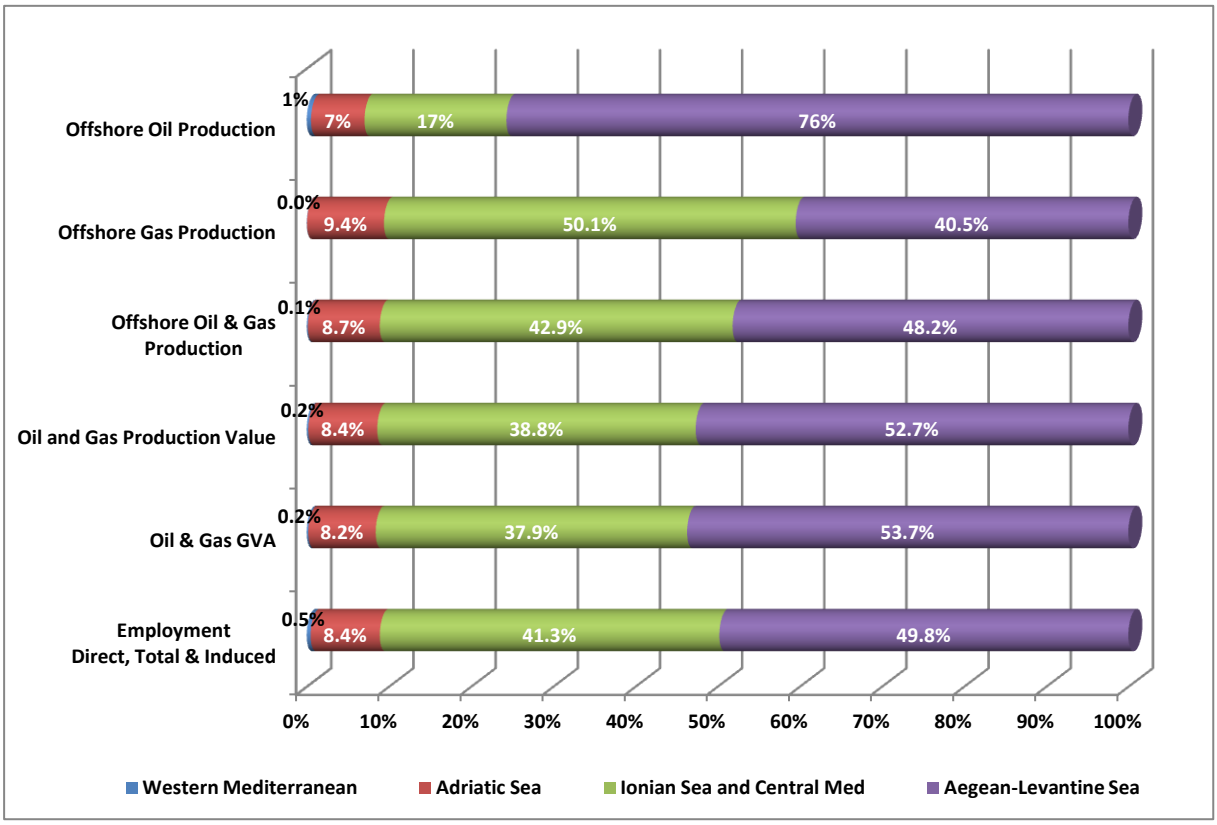
- Direct employment: 14 500 jobs, including 1 000 direct jobs for the development of the Israeli Tamar field and exploration on the area
- Total employment: 200 000 jobs, including 14 000 total jobs for the development of the Israeli Tamar field and exploration on the area

Projections

Current production and large promising reserves, mainly gas, are situated offshore southern and eastern coasts of the region, not far from large consumption areas. The outlook is for a robust growth in gas production, coming from Egypt and Israel, who will become gas exporters. Development of these fields will mainly depend on the political stability of the region.

3.5.5 Overview of offshore oil and gas extraction in the Mediterranean sub-regions

The following figure summarizes main sector, economic and social indicators characterizing the offshore oil and gas extraction sector among the different Mediterranean sub-regions considered in the assessment:



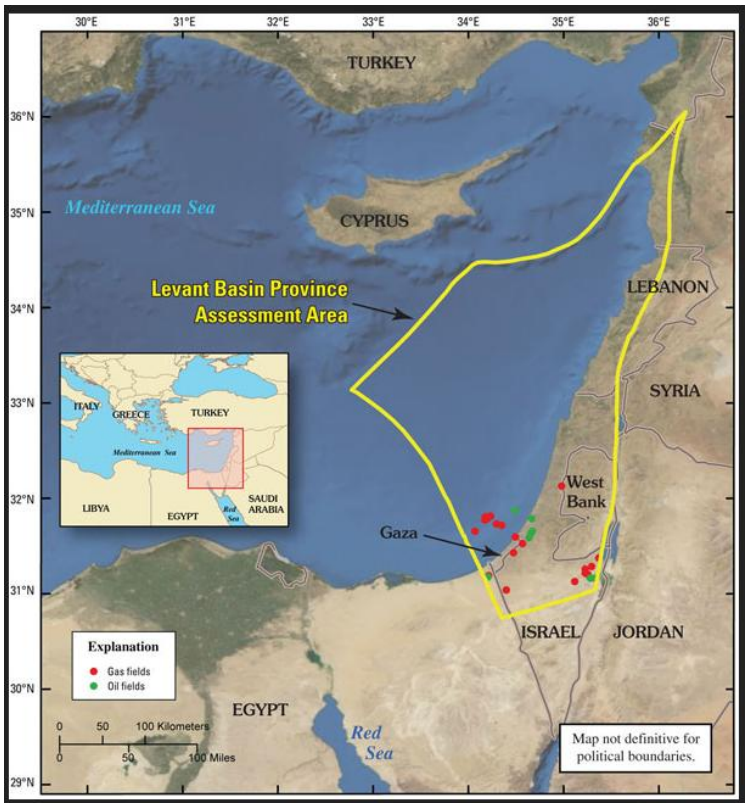
3.5.6 Perspectives and future trends of offshore oil and gas extraction in the Mediterranean region

With the current level of production, the reserve life of Mediterranean oil is thirty years and the one of gas is fifty years, considering both onshore and offshore productions. New exploration operations or production of oil and gas are under study or currently in process off the coasts of Spain, Croatia, Egypt, Israel, Lebanon, Libya, Tunisia, Turkey and in the Maltese and Cypriot waters. Algeria is also preparing to expand its exploration program to offshore areas.

Recent discoveries of large gas fields in the waters of Egypt, Israel and Lebanon or the oil discoveries in the waters of Libya strengthen some experts' predictions of an increase in oil drilling and gas in the coming years, mainly in the eastern part of the Mediterranean (Court, 2011).

Large natural gas reserves could be located off the south eastern Mediterranean shore, especially in the Levantine basin. In 2009, Israel's exploration partner Noble Energy discovered the Tamar field in the Levantine Basin, some 80km west of Israel's port of Haifa, at 1700 m water depth, with an estimated 8.3 trillion cubic feet (210 million of toe) high quality natural gas. One year after, the same consortium discovered the Leviathan field in the same Levantine geological basin at some 130 km west of the port of Haifa, at 1700 m water depth, with an estimate of 16 trillion cubic feet (400 million of toe). Tamar first delivered in March 2013, after four years of development works. Development of Leviathan is restrained by a territorial dispute with Lebanon.

Figure 7. USGS, 2010. Levant Basin Province Assessment Area



The USGS (US Geological Survey, 2010) estimated that 122 trillion cubic feet (3 050 millions toe) of undiscovered, technically recoverable natural gas was present in the Levant basin province, mostly offshore (see Figure 7). This assessment and recent discoveries in unprecedented geologic conditions is boosting offshore explorations in this province (Israel, Egypt and Cyprus) as well as in the Aegean Sea (Greece) and in central Mediterranean (Italy).

However, the development of the offshore oil and gas production in the eastern part of the Mediterranean is heavily conditioned by the evolution of the regional territorial conflicts.

In the coming decades, production will become deeper and deeper, as everywhere in the world. Deep water production has maintained offshore production at a steady level, offsetting the decline of mature shallow water field production. This general trend is valid for the Mediterranean Sea, as shown by Table 91. The Mediterranean being a deep sea, the development of deep offshore operations over 500 m depth is a factor favouring the exploitation of oil and gas in the Mediterranean region. These are major technological advances in the field of seismic and subsea facilities and an increase in crude oil prices that make investments profitable, even at great depths. This fact raises major environmental concerns as developed in the next section.

3.5.7 Environmental pressures of offshore oil and gas extraction

General considerations

Oil and gas exploration and production operations have a variety of potential impacts on the environment, depending upon the stage of the process, the nature and sensitivity of the surrounding environment, pollution prevention, mitigation and control techniques (Trabbucco, 2012). Main pressures and impacts induced by offshore hydrocarbon extraction are listed in Table 95.

Impacts can be roughly classed into two categories; the first is related to ecosystem disturbance due to the presence and operation of structures in the water column and on the bottom. The second is related to marine pollution due to oil spills, whether accidental or not.

With regard to the aquatic environment, the main problems are linked to the presence of the offshore structures and to waste streams. Presence implies disturbance to marine fauna, such as fish and marine mammals, by noises and vibrations in the operating area, as well as possible invasions of exotic species carried by assistance/ support and oil ships' ballast waters (Kloff and Wicks, 2004).

As for wastes, produced waters consist mainly of water extracted from the reservoir, relatively warm, containing dissolved and dispersed oil, polycyclic aromatic hydrocarbons (PAHs), heavy metals, high salt concentrations, no oxygen, and sometimes even radioactive materials (Steiner, 2003; Wills, 2000 and Patin, 1999). Volumes vary considerably throughout the life of a reservoir. Environmental impacts of offshore chronic pollution are not yet well known. However, the current research reveals the existence of cumulative and long-term impacts.

Table 95. Main pressures and impacts induced by offshore oil and gas extraction

EOs - ECOLOGICAL OBJECTIVES		DESCRIPTION OF PRESSURES / IMPACTS
EO2	Non-indigenous species	Associated shipping operations can cause biological disturbance due to potential introduction of non-indigenous species and translocation
EO9	Contaminants 9.3 Acute pollution	Accidental oil spills impacts could be local in case of small or medium oil spill or relatively large in case of large accidental oil spill. Impacted ecosystem components are mainly seabirds, fishes (including exploited) shellfishes (including exploited), marine mammals and benthic species
	Contaminants 9.1 Concentration of priority contaminants	Concentration of priority contaminants, especially due to release of polluted produced waters, inducing local impacts
EO11	Noise	Offshore operations generates vibrations and noises especially during the seismic surveys required by the exploration phase

Regarding marine pollution, it should be noted that globally, only 9% of marine oil pollution is attributable to offshore production, the majority of this pollution coming from maritime traffic (68%) and onshore facilities (23%) (Lentz and Felleman, 2003). However, in regions where offshore oil production is intensive, as in the North Sea, the marine pollution by oil due to offshore production rises to 32%. Local environmental impacts can be significant depending on the intensity of the activity. In addition, marine pollution related to petroleum may originate from several sources and it can be chronic or acute and more or less toxic. A relatively small but sudden amount of oil can have fatal acute effects on all marine life, while larger quantities of oil discharged for long periods may have chronic and sub-lethal effects on marine life.

Small (<7t) and medium (<700t) sized spills account for 95% of all the incidents recorded; a large percentage of these spills, 40% and 29% respectively, occurred during loading and discharging operations which normally take place in ports and oil terminals (ITOPF, 2012). However, there are several examples of best practices globally regarding port management and control systems of tanker traffic, in which the problem can be reduced to very low levels through the use of advanced technology and careful management.

Accidental pollutions are often severe and can be caused by both tankers and offshore oil facilities. If a large spill occurs, pollution reaches almost immediately levels lethal to plants, fish, birds and mammals. The consequences are particularly disastrous if oil spills happen close to coasts and accumulate in sediments of shallow coastal areas. Accidents caused by large oil spills involving offshore oil installations can be caused by various factors. Well blowout or pipeline ruptures are the most common. A recent example of a catastrophic accident is the major explosion of the *Deep Water Horizon* platform in the Gulf

of Mexico in April 2010, having rejected over three months between two and four million barrels of oil into the sea.

Policy context evolution in European waters and the Mediterranean Sea

The European Commission has considered that the scale and characteristics of recent offshore oil and gas accidents demand action. They expose the disparity between the increasing complexity of operations and the inadequacies in current risk-management practices. In Europe, oil and gas are mostly produced offshore and the likelihood of a major accident in Union waters needs to be reduced. It has been considered that the existing regulatory framework and operating arrangements do not provide for the most effective emergency response to accidents wherever they occur in Union waters, and the liabilities for clean-up and conventional damages are not fully clear.

In this context, the European Commission proposed by the end of 2011 a regulation of the European parliament and of the Council on safety of offshore oil and gas prospection, exploration and production activities[17]. On 28 June 2013, the European Union published a new Directive on the safety of offshore oil and gas operations in its Official Journal.

The objective of this Directive is to reduce as far as possible the occurrence of major accidents relating to offshore oil and gas operations and to limit their consequences, thus increasing the protection of the marine environment and coastal economies against pollution, establishing minimum conditions for safe offshore exploration and exploitation of oil and gas and limiting possible disruptions to Union indigenous energy production, and to improve the response mechanisms in case of an accident.

In September 2012, the IUCN's Members Assembly adopted a recommendation aiming at strictly regulating the development of offshore oil exploitation policies and projects in the Mediterranean. Through this motion, the World Conservation Congress asks the Mediterranean coastal states to regulate the development of offshore oil exploitation policies and projects in several ways including:

- to apply the precautionary principle to offshore development projects for remarkable and sensitive natural environments as well as protected areas
- to refuse to allow gas, oil or any other kind of exploration or exploitation permits for areas near natural sites which have national or international importance should any impacts be identified
- to reinforce prior scientific studies on the study of coastal and marine environments.

3.5.8 Data analysis

Oil and gas activities are very strategic and thus subject of plethoric factual information, aggregated in multiple business intelligence surveys at various scales, mostly made by specialized private companies who are generally selling at high price their production to professionals of the sector. Free reports generally concern outdated studies. Except for specialised reviews regarding offshore activities, offshore production is usually not set apart from the onshore one, as the same commodities (crude oil and natural gas) are produced. Published scientific publications are generally dealing with issues upstream production, such as geological studies, or downstream, such as impact of activities or intelligence surveys on the energy resources or needs in the region. For these reasons, this part has been built on few available references, from which data have been extrapolated by the authors in view of providing needed orders of magnitude and some general perspectives.

[17] Ref. COM/2011/0688 final - 2011/0309 (COD)

4 Conclusions

This Economic and Social Analysis was designed as a socioeconomic component completing the regional Initial Integrated Assessment (IIA) carried out in the context of the progressive implementation of the MAP Ecosystem Approach Initiative EcAp (Step 3). It aims at providing a socioeconomic picture of key human activities using the coastal and marine Mediterranean waters (fisheries, aquaculture, tourism and recreational activities, maritime transport and offshore exploitation of oil and gas) along with their environmental interactions and impacts with marine and coastal ecosystems. As for the IIA, the spatial scope of the report focuses both on the regional and four sub-regional Mediterranean basins considered by EcAp, i.e. the Western Mediterranean basin, the Adriatic Sea, the Ionian Sea and Central Mediterranean and the Aegean-Levantine Sea. Analysis at the level of the sub-regional basins, presenting similarities in terms physical, chemical, biological and ecological characteristics, allows to better address the magnitudes of human impacts and thus to develop concrete, well-focused managerial actions to decouple human well-being and resource exploitation from environmental degradation.

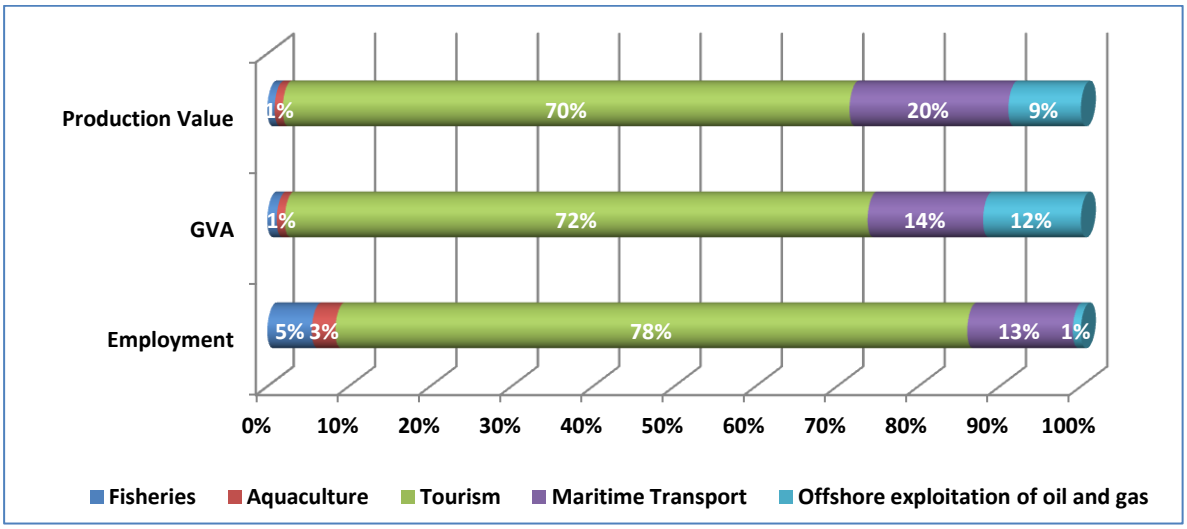
To this purpose, international, regional (e.g. World Bank, FAO and UN Databases, Eurostat) and occasionally country statistical services have been consulted to collect and manage under excel databases the most recent data available to describe and analyse these socioeconomic sectors. Statistics have been generally gathered at the country level and also at sub-country levels when existing, to fit with the sub-basin demarcations. Other sources, such as available national and regional reports, articles of specialized press and industrial data, have been also reviewed to complement data and better comprehend the extent of each activity in the region. The process of data gathering allowed better identifying knowledge and information gaps. When relevant, these gaps have been filled by estimates calculated under various assumptions, which have been accordingly explained, so as to provide as far as possible a homogenous analysis.

Difficulties encountered mainly concerned the granularity of the available data, not fine enough for the purpose of the study at regional and sub-regional levels, both in terms of geographical scope and sectorial definition. The geographical scope of such analysis, focusing on coastal and marine areas, is rarely coherent with those of data currently produced by the statistical authorities on a regular basis. This is specifically the case for socioeconomic sectors taking place both inland, on the coast or at sea such as aquaculture, tourism and recreational activities, and extraction of oil and gas. In addition, some countries bordering the Mediterranean Sea are characterized by multiple maritime façades (such as France, Egypt, Israel, Morocco, Spain and Turkey) which are not always considered in national statistics, thus making quite laborious data disaggregation by approximation at the proper level. The same difficulty was met for countries presenting maritime façades on multiple sub-regional basins, as several Mediterranean countries present coastlines belonging to more than one sub-region (Italy, Greece and Tunisia). Even if sector information existed at national levels, its breaking-up according to the area assessed was challenging and in, most cases, done according to the coastal length of the maritime façade considered. If availability and quality of socioeconomic data differs by regions or countries, in general lack of information at the proper granularity made difficult the collection of suitable and relevant data for the sector analysis. This is the case for socioeconomic sectors such as fisheries and aquaculture, which are frequently aggregated together if not within the general agriculture category. Finally, homogeneity of data originating from different sources proved to make comparison problematic and not always feasible, especially in case of data collected from national statistic authorities, moreover often available only in the national country languages. Owing to these constraints, the results of the Economic and Social Assessment have been built based on a number of estimates and assumptions. Therefore, the results achieved illustrate the orders of magnitude of the economic activities assessed, in terms of sector magnitude, production value, gross value added and employment.

With the caveats due to the difficulties met and the assumptions made to fill the gaps due to lack of relevant data availability, the Economic and Social Analysis highlighted that in the Mediterranean riparian countries the five key economic sectors assessed generated 360 billion Euros in terms of production value, 190 billion Euros in terms of GVA, and 4.2 million jobs in terms of contribution to employment.

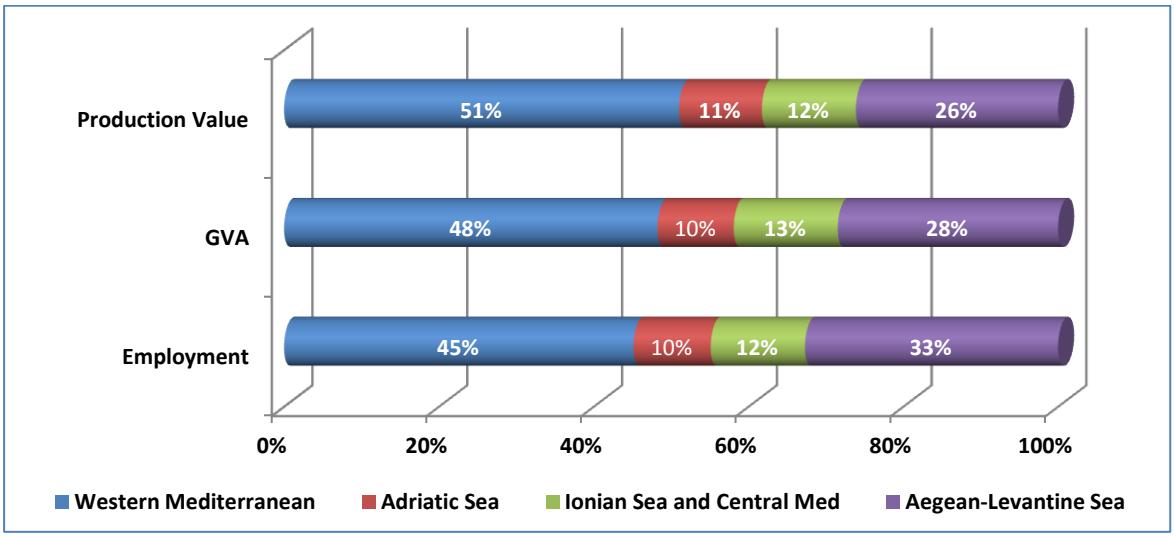
Considering the distribution between the sectors analysed, (Figure 8) coastal tourism is by far the most important sector, accounting for 70% of the production value and gross value added, and almost 80% of direct regional jobs. Maritime transport is the second most important economic activity with 20% of the total Mediterranean production value, 14% of gross value added and 13% of employment in the Mediterranean region. Far behind, the offshore exploitation of oil and gas sector generates 9% of production value, 12% of gross value added and only 1% in terms of employment. In contrast, the aquaculture and fisheries sectors show low shares of production value and gross value added (1%) yet their contribution to employment is –in comparison- more noticeable (5% and 3%, respectively). These results highlight that fishing, aquaculture and coastal tourism have relatively high social impacts since they generate employment, while other sectors such as the offshore oil and gas industry and maritime transport generate higher economic values but contribute less to the creation of employment in the Mediterranean region.

Figure 8. Distribution of the main socioeconomic indicators according the analysed sectors



Under the strong assumptions made to overcome data limitations for a sub-regional distribution of countries, sub-regional results show (Figure 9) that the Western Mediterranean and the Aegean-Levantine Sea reflect the highest economic and social impacts among Mediterranean sub-regions, the first accounting for shares close to 50% and the latter for 30%. However, the two sub-regions reflect contrasted patterns: the Aegean-Levantine Sea sub-region is relevant in terms of social impacts, since the economic activities assessed generate a larger share of employment rather than value; the Western Mediterranean, in contrast, shows that the economic sectors generally produce more value than they contribute to employment. Results concerning the Adriatic Sea and the Ionian Sea and Central Mediterranean show similar and more modest economic and social figures, in all cases close to 10% of the regional totals.

Figure 9. Distribution of the main socioeconomic indicators in the Mediterranean sub basins



This ESA Report also includes a qualitative analysis of expected future socioeconomic trends and the environmental impacts of each maritime economic activity assessed, which, together with the socioeconomic results, aims at providing support for future managerial stages in the Mediterranean region, in the context of the MAP EcAp implementation. A summary of the principal environmental impacts and damages to the coastal and marine environments can be found in Table 96. Comparison of both environmental and socioeconomic impacts of human activities, while keeping in mind the projected evolution of socioeconomic sectors, may allow the elaboration of future regional recommendations, action plans and programmes of measures to achieve Good Environmental Status （GES） of Mediterranean marine and coastal ecosystems.

Table 96. Environmental impacts on marine and coastal ecosystems of the Mediterranean Sea

Ecological Objectives (EO)		Fisheries	Aquaculture	Tourism and Recreational Activities	Maritime transport	Offshore extraction of oil and gas
		Fishing activity, bycatches and discards		Coastal dev. and construction of infrastructure and Recreation		Presence of structures and operations & Marine pollution
EO1	Biological diversity	**X**	**X**	**X**	**X**	**X**
EO2	Non - indigenous species	X	**X**		**X**	X
EO3	Commercial species	**X**	X	X		
EO4	Food webs	**X**				
EO5	Eutrophication		X	**X**	X	
EO6	Sea - floor	**X**	X	X	X	**X**
EO7	Hydrographic conditions	X	X	X		X
EO8	Coastal areas's natural dynamics			**X**		X
EO9	Contaminants	X	**X**	X	**X**	**X**
EO10	Marine Litter	**X**	X	**X**	X	X
EO11	Noise	X		X	**X**	X

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6 Appendixes

APPENDIX 1

List and description of the 11 Ecological Objectives of the MAP EcAp Initiative

EO	*Short Name*	*Descriptive*
EO1	Biological diversity	Biological diversity is maintained or enhanced. The quality and occurrence of coastal and marine habitats and the distribution and abundance of coastal and marine species are in line with prevailing physiographic, hydrographical, geographic, and climatic conditions.
EO2	Non-indigenous species	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem.
EO3	Commercial species	Populations of selected commercially exploited fish and shellfish are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
EO4	Food webs	Alterations to components of marine food webs caused by resource extraction or human-induced environmental changes do not have long-term adverse effects on food web dynamics and related viability.
EO5	Eutrophication	Human-induced eutrophication is prevented, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms, and oxygen deficiency in bottom waters.
EO6	Sea-floor	Sea-floor integrity is maintained, especially in priority benthic habitats.
EO7	Hydrographical conditions	Alteration of hydrographical conditions does not adversely affect coastal and marine ecosystems.
EO8	Coastal area's natural dynamics	The natural dynamics of coastal areas are maintained and coastal ecosystems and landscapes are preserved.
EO9	Contaminants	Contaminants cause no significant impact on coastal and marine ecosystems and human health.
EO10	Marine litter	Marine and coastal litter does not adversely affect coastal and marine environments.
EO11	Noise	Noise from human activities causes no significant impact on marine and coastal ecosystems.

APPENDIX 2

Data and calculations

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Appendix 2-1. Ratios applied to the sub-regional analysis, by sector

1. Ratios applied to the sub-regional analysis of the Mediterranean fisheries sector

Greece	Ratio Production	Ratio Production Value	Ratio GVA	Ratio Employment	Data Source
Aegean-Levantine Sea	**78%**	**71%**	**16%**	**80%**	EC Initial Assessment, 2012, Greece
Ionian Sea and Central Med	**22%**	**29%**	**84%**	**20%**	
Italy					
Adriatic Sea	**42%**	**42%**	**45%**	**34%**	EC Initial Assessment, 2012, Italy
Ionian Sea and Central Med	**29%**	**29%**	**26%**	**28%**	
Western Mediterranean	**29%**	**29%**	**29%**	**38%**	
Tunisia					
Western Mediterranean	**32%**	**32%**	**32%**	**32%**	Plan Bleu calculations of coastal length
Ionian Sea and Central Med	**68%**	**68%**	**68%**	**68%**	

2. Ratios applied to the sub-regional analysis of the Mediterranean aquaculture sector

Tunisia	Ratio	Italy	Ratio	Greece	Ratio
Western Mediterranean	**32%**	Adriatic Sea	**19%**	Aegean-Levantine Sea	**50%**
Ionian Sea and Central Med	**68%**	Ionian Sea and Central Med	**17%**	Ionian Sea and Central Med	**50%**
		Western Mediterranean	**64%**		
Data Source	Plan Bleu calculations of coastal length		Plan Bleu calculations of coastal length		EC Initial Assessment 2012, Greece

3. Ratios applied to the sub-regional analysis of the Mediterranean tourism and recreational activities sector

Tunisia	Ratio	Italy	Ratio	Greece	Ratio
Western Mediterranean	**32%**	Adriatic Sea	**19%**	Aegean-Levantine Sea	**77%**
Ionian Sea and Central Med	**68%**	Ionian Sea and Central Med	**17%**	Ionian Sea and Central Med	**23%**
		Western Mediterranean	**64%**		
Data source	Plan Bleu calculations of coastal length		Plan Bleu calculations of coastal length		EC Initial Assessment, 2012, Greece

4. Ratios applied to the sub-regional analysis of the Mediterranean maritime transportation sector

Tunisia	Ratio	Italy	Ratio	Greece	Ratio
Western Mediterranean	**32%**	Adriatic Sea	**19%**	Aegean-Levantine Sea	**89%**
Ionian Sea and Central Med	**68%**	Ionian Sea and Central Med	**17%**	Ionian Sea and Central Med	**11%**
		Western Mediterranean	**64%**		
Data source	Plan Bleu calculations of coastal length		Plan Bleu calculations of coastal length		Plan Bleu calculations of coastal length

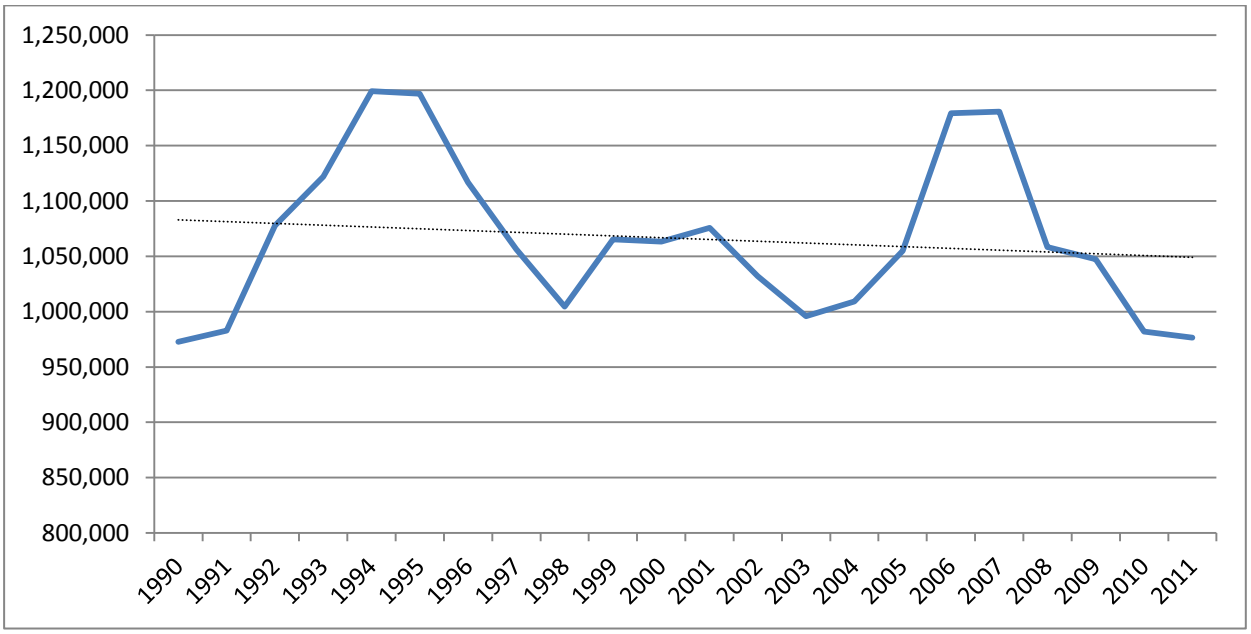
Appendix 2-2. Annual fish landings in Mediterranean countries (Mediterranean façades), 2000-2011

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Albania	2.372	1.839	2.436	1.535	2.705	2.769	3.184	2.819	3.215	3.555	3.097	2.977
Algeria	113.157	133.623	134.320	140.957	113.462	126.259	145.762	147.362	138.861	127.513	93.607	101.759
Croatia	20.968	17.807	21.096	19.844	30.004	34.612	37.730	40.071	48.944	55.292	52.337	70.454
Cyprus	2.235	2.245	1.908	1.734	1.526	1.886	2.135	2.426	1.991	1.385	1.400	1.164
Egypt	54.872	59.624	59.619	46.973	47.481	56.721	72.666	83.762	88.882	78.790	77.388	77.799
France	45.174	42.812	44.382	47.512	37.533	31.167	32.234	37.380	21.893	19.686	17.204	11.365
Greece	88.877	82.424	84.357	83.829	85.939	86.303	89.674	87.964	82.964	78.146	67.035	67.427
Israel	3.966	3.618	3.444	2.961	2.103	2.680	2.145	2.545	2.434	2.261	2.136	2.138
Italy	248.985	249.925	208.367	230.199	226.981	278.344	296.892	273.205	221.633	239.539	228.420	210.679
Lebanon	3.646	3.650	3.673	3.613	3.601	3.523	3.541	3.541	3.541	3.541	3.541	3.541
Libya	49.076	47.051	43.342	41.163	39.897	37.390	34.594	31.921	47.645	52.110	50.000	30.000
Malta	1.075	903	1.084	1.138	1.138	1.406	1.330	1.236	1.279	1.596	1.793	1.870
Montenegro	0	0	0	0	0	0	736	687	837	772	809	715
Morocco	34.903	27.517	31.856	36.959	40.090	45.973	50.524	42.138	35.753	40.578	33.914	26.632
Palestine	2.623	1.950	2.379	1.507	2.951	1.814	2.323	2.702	2.843	1.525	1.700	1.319
Slovenia	1.631	1.621	1.460	1.086	814	1.022	931	916	687	868	765	729
Spain	140.128	139.102	117.862	92.819	93.974	109.851	130.705	119.361	105.253	102.192	99.490	104.132
Syria	2.581	2.322	2.823	3.060	3.077	3.677	3.395	3.381	3.212	3.107	2.956	2.200
Tunisia	94.617	97.495	95.605	89.193	110.366	107.702	109.772	102.234	96.379	96.408	96.535	101.854
Turkey Med	152.517	160.070	172.104	149.918	165.620	121.731	158.982	195.093	150.157	138.568	147.823	157.758
Mediterranean Sea	**1.063.402**	**1.075.598**	**1.032.117**	**996.000**	**1.009.262**	**1.054.830**	**1.179.254**	**1.180.742**	**1.058.402**	**1.047.432**	**981.949**	**976.509**

Source: FAO-FishStat Database

.

Appendix 2-3. Evolution of Mediterranean fish landings, 1990-2011



Source: FAO-FIshStat Database.

Appendix 2-4. Fishing and Aquaculture. Calculation of ratios GVA/Production Value to estimate the GVA of Fisheries and Aquaculture based on Production Value

Country or Area	Sub Item	Item	Currency	Value	Value Euros	Ratio GVA/ Prod. value	Country
Albania	Fishing (B)	Output, at basic prices	Lek	4.437.644.549	36.388.685	**0,43**	**Albania**
Albania	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Lek	1.901.038.950	15.588.519		
B & H	Fishing (B)	Output, at basic prices	convertible Marks	29.000.000	14.830.600	**0,28**	**B & H**
B & H	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	convertible Marks	8.000.000	4.091.200		
Croatia	Fishing (B)	Output, at basic prices	Kuna	1.544.524.000	213.762.122	**0,46**	**Croatia**
Croatia	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Kuna	716.859.000	99.213.286		
Cyprus	Fishing (B)	Output, at basic prices	Euro	43.300.000	43.300.000	**0,68**	**Cyprus**
Cyprus	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Euro	29.300.000	29.300.000		
France	Fishing (B)	Output, at basic prices	1999 FRF Euro / Euro	2.036.000.000	2.036.000.000	**0,64**	**France**
France	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	1999 FRF Euro / Euro	1.309.000.000	1.309.000.000		
Greece	Fishing (B)	Output, at basic prices	2001 GRD Euro / Euro	1.119.840.503	1.119.840.503	**0,72**	**Greece**
Greece	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	2001 GRD Euro / Euro	811.516.284	811.516.284		
Italy	Fishing (B)	Output, at basic prices	1999 ITL Euro / Euro	2.064.060.726	2.064.060.726	**0,64**	**Italy**
Italy	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	1999 ITL Euro / Euro	1.323.382.285	1.323.382.285		
Malta	Fishing (B)	Output, at basic prices	Euro	103.067.000	103.067.000	**0,12**	**Malta**
Malta	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Euro	12.040.000	12.040.000		
Montenegro	Fishing (B)	Output, at basic prices	Euro	0		**-**	**Montenegro**
Montenegro	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Euro	0			
Morocco	Fishing (B)	Output, at basic prices	Moroccan Dirham	9.949.000.000	876.506.900	**0,78**	**Morocco**
Morocco	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Moroccan Dirham	7.721.000.000	680.220.100		
Slovenia	Fishing (B)	Output, at basic prices	Euro	8.482.636	8.482.636	**0,37**	**Slovenia**
Slovenia	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Euro	3.099.179	3.099.179		
Spain	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	1999 ESP Euro / Euro	1.679.000.000	1.679.000.000	**-**	**Spain**
Tunisia	Fishing (B)	Output, at basic prices	Tunisian Dinar	455.771.684	252.451.936	**0,81**	**Tunisia**
Tunisia	Fishing (B)	Equals: VALUE ADDED, GROSS, at basic prices	Tunisian Dinar	368.301.399	204.002.145		

Source: UN Database (2008).

Appendix 2-5. Average ratios GVA/ Production Value

Note: Average ratios have been estimated.

Area	Countries	Average Ratios GVA/ Production Value
Average Southern Mediterranean countries	Morocco, Tunisia	0,79
Average Balkan Countries	Albania, Croatia, Slovenia	0,42
Aegean Levantine Countries	Cyprus, Greece	0,70
Average Western Mediterranean	Algeria, France, Italy, Morocco	0,71

Appendix 2-6. Estimation of the Production Value of Egyptian Fisheries (only Mediterranean façade)

Based on FAO – Medifisis Technical Report and Fish Statistics Year Book 2012.

Egypt (2008):

Information		Source information
GVA Agriculture Egypt:	17% of Total GDP	FAO - Medfisis Technical Report
GVA Fisheries Egypt:	8% of Agricultural GDP	FAO - Medfisis Technical Report
GDP Egypt 2008 (million USD):	130 472	http://www.tradingeconomics.com/egypt/gdp
Fisheries Production Egypt:	26% of Total Fisheries+Aquaculture Production	Fish Statistics Year Book 2012
Aquaculture Production Egypt:	74% of Total Fisheries+Aquaculture Production	Fish Statistics Year Book 2012
Fisheries Mediterranean Egypt:	20% of Total Egypt Fisheries	Fish Statistics Year Book 2012

Calculations	Value	Coefficient used	Units
GVA Agriculture Egypt:	22 180	GVA Agriculture Egypt / Total GVA	million USD
GVA Total Fisheries + Aquaculture Egypt:	1 774	GVA Fisheries+Aquaculture / Total GVA Agriculture	million USD
GVA Fisheries	461	Ratio Fisheries Prod / (Fisheries+Aquaculture Prod)	million USD
GVA Fisheries Mediterranean	**92**	Ratio Fisheries Med / Total Fisheries	million USD
Gross Value Mediterranean Fisheries in Egypt	**117**	GVA/ Turnover ratio Southern Med countries	million USD

Appendix 2-7. Ratios GVA/Turnover and country GVA estimates for Mediterranean fisheries

Country	**Gross values of marine fisheries (million USD)**	**Data source**	**Ratio GVA/Turnover**	**GVA (million USD)**
Albania	13,8	Sacchi, 2011	0,43	5,91
Algeria	548	Sacchi, 2011	0,79	434,05
Croatia	419,5	Sacchi, 2011	0,46	194,70
Cyprus	64,8	Sacchi, 2011	0,68	43,85
Egypt*	117	FAO Mefisis Report Fish Statistic Year	0,79	92,67
France	322,8	Sacchi, 2011	0,64	207,54
Greece	577	Sacchi, 2011	0,72	418,14
Israel	16,7	Sacchi, 2011	0,70	11,69
Italy	1565	Sacchi, 2011	0,64	1003,41
Lebanon	na	Sacchi, 2011	0,70	na
Libya	136,9	Sacchi, 2011	0,79	108,43
Malta	12,6	Sacchi, 2011	0,12	1,47
Morocco	21,2	Sacchi, 2011	0,78	16,45
Montenegro	5,9	Sacchi, 2011	0,42	2,48
Palestine	n.a.			n.a.
Slovenia	2,2	Sacchi, 2011	0,37	0,80
Spain	354	Sacchi, 2011	0,71	251,34
Syria	241,9	Sacchi, 2011	0,70	169,33
Tunisia	150,6	Sacchi, 2011	0,81	121,99
Turkey	156	Sacchi, 2011	0,70	109,20
Mediterranean Sea	**4725,9**			**3193,46**

Appendix 2-8. Trade balance (exports and imports) of fish products in Mediterranean countries

Country / Year	2009					
	Weight (000 Tonnes)			Value (Million US Dollars)		
	Exports	Imports	Exports-Imports	Exports	Imports	Exports-Imports
Albania	3,5	9,7	-6,2	31,9	25,3	6,6
Algeria	1,3	20,8	-19,5	7,1	43,3	-36,3
Bosnia and Herzegovina	1,3	11,5	-10,2	5,7	30,2	-24,5
Croatia	28,5	40,3	-11,8	99,1	82,8	16,3
Cyprus	2,0	17,1	-15,1	12,2	57,0	-44,8
Egypt	5,0	229,9	-224,9	13,9	385,1	-371,3
France	213,9	776,4	-562,5	1098,6	3759,1	-2660,5
Greece	126,8	222,9	-96,0	626,2	577,5	48,7
Israel	1,1	39,3	-38,2	19,2	152,6	-133,4
Italy	106,7	754,3	-647,6	473,4	3569,8	-3096,4
Lebanon	0,3	22,8	-22,4	1,8	73,5	-71,7
Libya	0,6	4,8	-4,2	1,4	13,6	-12,2
Malta	1,8	32,8	-31,0	9,3	38,3	-29,0
Montenegro	0,2	2,5	-2,3	1,4	10,1	-8,7
Morocco	523,9	47,0	476,9	1539,5	87,3	1452,3
Palestine	0,0	0,2	-0,1	0,1	0,5	-0,5
Slovenia	3,0	11,7	-8,7	15,6	49,0	-33,5
Spain	721,3	1189,8	-468,6	2157,9	4605,7	-2447,8
Syria	0,1	10,2	-10,1	0,5	16,5	-15,9
Tunisia	18,1	23,1	-5,1	111,0	37,4	73,6
Turkey	42,8	125,9	-83,1	221,1	143,2	77,9
Total Mediterranean	**765,1**	**2.113,8**	**-1.348,7**	**3.017,0**	**8.053,9**	**-5.037,0**
	Weight (000 Tonnes)			**Value (Million EUR)**		
	Exports	**Imports**	**Exports-Imports**	**Exports**	**Imports**	**Exports-Imports**
Total Mediterranean	**765**	**2.114**	**-1.349**	**3.017**	**8.054**	**-5.037**

Source: FishStat Database. Currency Exchange USD/ EUR 2009: 0.7194

Appendix 2-9. Contribution to primary employment of the fisheries sector in Mediterranean countries

Country	Employment Fisheries
Albania	990
Algeria	39000
Croatia	15000
Cyprus	930
Egypt	18000
Spain	8900
France	2500
Greece	21400
Israel	1500
Italy	30500
Lebanon	8500
Libya	7700
Malta	2100
Morocco	16250
Montenegro	510
Palestine	3300
Slovenia	440
Syria	4000
Tunisia	49000
Turkey	1900
Total Mediterranean	**232.420**

Source: Sacchi, 2011.

Appendix 2-10. The Mediterranean fishing fleet. Reported fishing vessels in Mediterranean Geographical Sub-Areas

Data source	GSA	Name	Bulletin - Year	Country	Gaps	Vessels Reported
GFCM	1	Northern Alboran Sea	2010	Spain		1.758
GFCM	2	Alboran Island	2010	Spain		75
GFCM	3	Southern Alboran Sea	2010	Morocco		1.482
GFCM	4	Algeria	2008	France, Spain	Algeria	125
GFCM	5	Balearic Islands	2010	Spain		745
GFCM	6	Northern Spain	2010	Spain		1.819
GFCM	7	Gulf of Lions	2010	France, Spain		1.249
GFCM	8	Corsica Island	2010	France		182
GFCM	9	Ligurian and North Tyrrhenian Sea	2010	Italy		1.769
GFCM	10	South and Central Tyrrhenian Sea	2010	Italy		2.810
GFCM	11	Sardinia	2010	Italy		1.253
GFCM	12	Northern Tunisia	2010	Tunisia		2.377
GFCM	13	Gulf of Hammamet	2010	Tunisia		2.335
GFCM	14	Gulf of Gabes	2010	Tunisia		6.651
GFCM	15	Malta Island	2010	Malta		1.111
GFCM	16	South of Sicily	2010	Italy		1.264
GFCM	17	Northern Adriatic Sea	2010	Italy	Slovenia, Croatia	3.351
GFCM	18	Southern Adriatic Sea	2010	Albania, Italy		1.615
GFCM	19	Western Ionian Sea	2010	Italy		1.645
GFCM	20	Eastern Ionian Sea	2010	Greece		4.173
GFCM	21	Southern Ionian Sea	2008	France, Lybia, Spain		4.584
GFCM	22	Aegean Sea	2010	Greece, Turkey		18.270
GFCM	23	Crete Island	2010	Greece		950
GFCM	24	North Levant	2010	Turkey		2.040
GFCM	25	Cyprus Island	2008	Cyprus, France		565
GFCM	26	South Levant	2008	Cyprus, France		36
GFCM	27	Levant	2008	Cyprus, France		37
Sacchi, 2011	4	Algeria	2008			4.441
Sacchi, 2011	17	Croatia	2008			3.823
Sacchi, 2011	17	Slovenia	2008			181
		Total Mediterranean				**72.716**

Source: GFCM Statistical Bulletins (2011 and 2013)

Appendix 2-11. Mediterranean fishing fleet. Tonnages

GSA	A	B	C	D	E	F	G	H	I	J	K	L	M	Total
1	0	134	2332	39	12476	4302	115	3176	5584	0	0	424	1304	**29886**
2					3144	998								**4142**
3		n.a.	461		5031	764	76	5847						**12179**
4									454253		8143			**462396**
5		5	1647		3780	1439	16	63	1687			66	87	**8790**
6			1768	272	31434	23403		7621	7718			85	5420	**77721**
7		11	154	82	2027	2747	108	333	325	893	4357	58	205	**11300**
8		26	552	14	157	153			47				32	**981**
9		171	2048	153	10128	690		1119				182	1056	**15547**
10		508	3541		6002			1617	416		1255	94	2321	**15754**
11		184	1814		2740	2891							1130	**8759**
12	1250	210	5620		2154	4855	26	4005		764			2500	**21384**
13	1500	200	4080		2441	4108	130	7170			837		3400	**23866**
14	6250	250	10700		14000	8094	183	4085		571	4963		1400	**50496**
15		555	1654		1828	1604		57	1844				899	**8441**
16		172	1018		12406	20329		765	1461	476			427	**37054**
17		486	2106	338	20364	9028		1650		7298		3101	100	**44471**
18	9	155	220	19	10135	2137		693	557	3164		524	684	**18298**
19		315	1637		4046			396	2494				1824	**10711**
20	4232	93661	614144		1070	1290	667	131718					80013	**926795**
21	0	0	14524		0	0		0	0		0			**14524**
22	8538	285095	2065823		6871	5252	27	983826	6929	82	260	22	645452	**4008177**
23	672	21121	199449		84	919	1048	40324					70504	**334121**
24		188	3038		6358	763		3144	3902				2183	**19576**
25		30	1540		92	269		147			8143		1048	**11269**
26						128		147			8143		80	**8498**
27											8143		182	**8325**
Med. Sea	**22451**	**403477**	**2939869**	**917**	**158768**	**96163**	**2397**	**1197901**	**487216**	**13249**	**44245**	**4559**	**822250**	**6193463**

Source: GFCM Statistical Bulletins (2011 and 2013).

Appendix 2-12. Fleet segments

A	Polyvalent small-scale vessels without engine (<12m)
B	Polyvalent small-scale vessels with engine (<6 m)
C	Polyvalent small-scale vessels with engine (6-12 m)
I	Long-liners (> 6 m)
D	Trawlers (< 12 m)
E	Trawlers (12-24 m)
F	Trawlers (> 24 m)
L	Dredgers (> 6 m)
G	Purse seiners (6 - 12m)
H	Purse seiners (>12m)
J	Pelagic trawlers (> 6m)
K	Tuna seiners (> 12 m)
M	Polyvalent vessels (> 12 m)

Source: GFCM Statistical Bulletins (2011 and 2013).

Appendix 2-13. Aquaculture farms in Mediterranean waters, number

Country	Farms
Albania	50
Algeria	10
Bosnia and Herzegovina	n.a.
Croatia	335
Cyprus	20
Egypt	6.000
France	620
Greece	1.500
Israel	60
Italy	907
Lebanon	200
Libya	10
Malta	9
Montenegro	42
Morocco	2
Palestine	n.a.
Slovenia	277
Spain	200
Syria	2.060
Tunisia	54
Turkey	356
Mediterranean Sea	12.712

Source: Sacchi, 2011.

Appendix 2-14. Aquaculture production (tons) in Mediterranean marine and brackish waters, 2000-2011

Country	Environ.	Fishing area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Albania	Brackishwater	Mediterranean and Black Sea	200	150	300	860	800	860	1.360	1.360	950	1.250	1.410	1.300
Albania	Marine	Mediterranean and Black Sea	2	114	200	250	400	250	370	405	350	378	475	375
Algeria	Brackishwater	Mediterranean and Black Sea	47	64	65	23	14	14	16	45	10	48	119	200
Algeria	Marine	Mediterranean and Black Sea												
B & H	Marine	Mediterranean and Black Sea			260	260	107	251	265	299	307	260	260	279
Croatia	Marine	Mediterranean and Black Sea	3.485	5.802	5.635	6.265	7.520	7.820	10.410	9.650	9.420	9.163	8.943	6.563
Cyprus	Marine	Mediterranean and Black Sea	1.735	1.725	1.705	1.654	2.339	2.348	2.680	2.334	2.810	3.337	4.045	4.670
Egypt	Brackishwater	Africa - Inland waters	303.573	300.777	330.683	394.772	401.849	499.834	506.841	566.360	594.982	597.881	765.046	815.883
France	Brackishwater	Mediterranean and Black Sea												
France	Marine	Mediterranean and Black Sea	21.414	30.499	26.137	29.888	26.399	28.089	29.977	29.992	25.900	24.176	22.285	22.685
Greece	Brackishwater	Mediterranean and Black Sea	882	818	562	668	682	642	930	678	611	547	663	650
Greece	Marine	Mediterranean and Black Sea	91.168	92.924	84.312	97.850	93.430	102.285	108.414	108.912	110.095	118.107	117.063	137.916
Israel	Marine	Mediterranean and Black Sea	2.914	3.161	3.056	3.109	3.354	3.196	2.725	2.231	2.261	1.004	1.175	1.370
Italy	Brackishwater	Mediterranean and Black Sea	107.850	106.800	45.156	31.050	33.664	79.673	34.672	71.366	33.953	37.853	42.893	43.253
Italy	Marine	Mediterranean and Black Sea	59.906	63.168	101.483	118.126	50.928	67.858	104.979	68.002	75.760	85.233	71.953	72.088
Libya	Marine	Mediterranean and Black Sea					231	231	230	230	230	230	230	230
Malta	Brackishwater	Mediterranean and Black Sea												
Malta	Marine	Mediterranean and Black Sea	1.746	1.235	1.116	887	868	736	1.936	2.716	2.702	2.868	2.916	2.156
Mont.	Brackishwater	Mediterranean and Black Sea							9	9	9	9	9	9
Mont.	Marine	Mediterranean and Black Sea							220	227	295	325	320	320
Morocco	Brackishwater	Mediterranean and Black Sea	35	28	24	24	30	27						
Morocco	Marine	Mediterranean and Black Sea	662	547	768	832	785	1.197	51	79	33	74	49	64
Slovenia	Marine	Mediterranean and Black Sea	117	154	120	206	273	228	193	316	274	377	119	495
Spain	Brackishwater	Mediterranean and Black Sea					2	1	5	2			1.143	52
Spain	Marine	Mediterranean and Black Sea	10.832	12.655	13.761	16.248	19.063	19.083	22.476	26.793	27.787	29.679	29.223	30.338
Tunisia	Brackishwater	Mediterranean and Black Sea	719	955	1.106	1.075	1.206	1.329	1.319	2.067	2.024	2.963	3.930	7.177
Tunisia	Marine	Mediterranean and Black Sea			5	152	44	213	450	430	420	740	350	70
Turkey	Marine	Mediterranean and Black Sea	35.646	29.730	26.868	39.726	50.335	70.963	72.639	81.710	86.339	83.391	89.153	88.444
Mediterranean Sea			**642.933**	**651.306**	**643.322**	**743.925**	**694.323**	**887.128**	**903.167**	**976.213**	**977.522**	**999.892**	**1.163.772**	**1.236.587**

Source: FAO-FishStat Database

Appendix 2-15. Economic value (000 USD) of aquaculture production in Mediterranean marine and brackish waters, 2000-2011

Country	Environment	Fishing area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Albania	Brackishwater	Mediterranean and Black Sea	73,2	149,8	707,8	544,9	861,1	971	1507,6	796,8	1054	1086,8	902,5
Albania	Marine	Mediterranean and Black Sea	395,8	570,8	823	1556,7	1001,3	1509,6	2035,3	2330,3	2419,9	2779,7	2417,5
Algeria	Brackishwater	Mediterranean and Black Sea	241,6	243,2	69,2	36	36	32	93	51,7	368,7	1161,8	1697,6
Algeria	Marine	Mediterranean and Black Sea											
B & H	Marine	Mediterranean and Black Sea		1238	1323	614	1706,2	1815,7	2017,7	2073,6	1771	1771	2039,7
Croatia	Marine	Mediterranean and Black Sea	22963	27640	25786,6	37637,6	36965,8	53425,4	46485,2	47098,2	70444,8	57074,5	53525,3
Cyprus	Marine	Mediterranean and Black Sea	7947,1	8925,7	9720,6	18086,6	18398,7	19779,9	18884,7	23285	23683,7	26520,5	38617,1
Egypt	Brackishwater	Africa - Inland waters	689313,7	592516,8	561743,4	547115,9	752807,3	818831,6	1062084,1	1035910,1	1118294,2	1326733,9	1563978,3
France	Brackishwater	Mediterranean and Black Sea											
France	Marine	Mediterranean and Black Sea	59611,5	61443,1	75743,3	86774,5	96440,2	97465,2	106103,6	98034,2	82372,6	71512,8	79149
Greece	Brackishwater	Mediterranean and Black Sea	3255	2037,7	2942,9	2936,1	3123,5	4477,7	3940,4	5888,2	5309,5	4952,5	5078,6
Greece	Marine	Mediterranean and Black Sea	289566,6	231206,3	333367,4	353229,5	410032,9	444837,1	510738	519079,2	533088,7	565842,7	697427,5
Israel	Marine	Mediterranean and Black Sea	20277	16460,9	16318,4	18352,5	17828,1	24679,9	16369,4	21873,4	7244,1	10029,7	11567,1
Italy	Brackishwater	Mediterranean and Black Sea	169648,8	141902	156971	131245,3	295162,1	149199,7	411445,2	169055,3	183268	188278,1	202795
Italy	Marine	Mediterranean and Black Sea	109983,7	113312	208696,5	134758,9	192116,5	336856,2	211862	138560,2	136058,2	114803,4	120915,7
Libya	Marine	Mediterranean and Black Sea				1094	1094	1090	1090	1090	1090	1090	1090
Malta	Brackishwater	Mediterranean and Black Sea											
Malta	Marine	Mediterranean and Black Sea	3080	3747,1	4540,9	6328,3	5365,6	19355,2	27273,2	35574,4	22580,5	30388,8	38380,8
Montenegro	Brackishwater	Mediterranean and Black Sea						72	72	72	72	72	72

Country	Environment	Fishing area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Montenegro	Marine	Mediterranean and Black Sea						715,7	1049,9	1412,8	1573,9	1539,2	1614
Morocco	Brackishwater	Mediterranean and Black Sea	165,2	192	216	338,5	304,9						
Morocco	Marine	Mediterranean and Black Sea	2105,7	2890	3679	3364	5292	248	527,7	253,9	565,7	337,5	560,6
Slovenia	Marine	Mediterranean and Black Sea	580,5	298,1	602,4	1153,3	402,6	521,6	422,3	1349,6	982,6	327,5	814,8
Spain	Brackishwater	Mediterranean and Black Sea				8	4	20	8			1809,2	653,4
Spain	Marine	Mediterranean and Black Sea	88024,5	86140	95282	115385	112554	130818	157722	161548,6	158901,6	170976,6	192433,5
Tunisia	Brackishwater	Mediterranean and Black Sea	7350,9	7182,6	6802,2	9656,5	9271,3	10067	14438,3	17218,7	22084	27618,5	52176,2
Tunisia	Marine	Mediterranean and Black Sea		45	1368	396	1917	4050	3870	3780	6660	3500	770
Turkey	Marine	Mediterranean and Black Sea	87192,9	79331	180500,6	249960	352213,5	359592,1	410129,8	455173,6	415425,8	492048,5	493261,8
Mediterranean Region			**1.561.777**	**1.377.472**	**1.687.204**	**1.720.572**	**2.314.899**	**2.480.431**	**3.010.169**	**2.741.510**	**2.795.314**	**3.102.255**	**3.561.938**

Source: FAO-FishStat Database

Appendix 2-16. Contribution to employment of the Mediterranean aquaculture sector

Country	Primary Employment Aquaculture	Secondary Employment Fishing & Aquaculture
Albania	2.500	1.600
Algeria	100	19.200
Bosnia and Herzegovina		
Croatia	1.670	246.570
Cyprus	250	1.330
Egypt	68.000	131.000
France	1.660	4.960
Greece	9.880	34.480
Israel	600	4.400
Italy	7.770	67.670
Lebanon	800	12.500
Libya	140	11.340
Malta	960	4.260
Montenegro	170	980
Morocco	30	31.280
Palestine		4.400
Slovenia	230	770
Spain	3.060	17.660
Syria	12.000	34.600
Tunisia	1.000	96.000
Turkey	12.000	40.900
Mediterranean Sea	**122.820**	**765.900**

Source: Sacchi, 2011.

Appendix 2-17. The Mediterranean coastal share per country of tourism and recreational activities, domestic and international

Country	Share Coastal / Total Domestic Tourism	Share Coastal / Total International Tourism
Albania	50%	50%
Algeria	50%	30%
Bosnia and Herzegovina	10%	10%
Croatia	72%	93%
Cyprus	100%	100%
Egypt	35%	10%
France	18%	20%
Greece	90%	95%
Israel	80%	70%
Italy	70%	65%
Lebanon	80%	65%
Libya	85%	95%
Malta	100%	100%
Montenegro	15%	10%
Morocco	30%	15%
Palestine	20%	10%
Slovenia	25%	25%
Spain	40%	70%
Syria	30%	10%
Tunisia	90%	95%
Turkey	40%	65%

Source: Plan Bleu, 2005.

Appendix 2-18. International tourism arrivals

Country	Total			Coastal Mediterranean			Notes
	2010	2011	2012	2010	2011	2012	
Albania	2.347	2.865	3.156	1.174	1.433	1.578	
Algeria	2.070	2.395	2.634	621	719	790	
Bosnia and Herzegovina	365	392	439	37	39	44	
Croatia	9.111	9.927	10.369	8.473	9.232	9.643	
Cyprus	2.173	2.392	2.465	2.173	2.392	2.465	
Egypt	14.051	9.497	11.196	1.405	950	1.120	
France	77.648	81.552	83.018	15.530	16.310	16.604	
Greece	15.007	16.427	15.518	14.257	15.606	14.742	
Israel	2.803	2.820	2.886	1.962	1.974	2.020	
Italy	43.626	46.119	46.360	28.357	29.977	30.134	
Lebanon	2.168	1.655	1.365	1.409	1.076	887	
Libya							na
Malta	1.348	1.425	1.454	1.348	1.425	1.454	
Montenegro	1.088	1.201	1.264	109	120	126	
Morocco	9.288	9.342	9.375	1.393	1.401	1.406	
Palestine	522	449	488	52	45	49	
Slovenia	1.869	2.037	2.156	467	509	539	
Spain	52.677	56.177	57.701	36.874	39.324	40.391	
Syria	8.546	5.070	5.070*	855	507	507*	*value of 2011
Tunisia	6.902	4.782	5.950	6.557	4.543	5.653	
Turkey	31.364	34.654	35.698	20.387	22.525	23.204	
Mediterranean Sea	**284.973**	**291.178**	**298.562**	**143.438**	**150.107**	**153.355**	

Source: UNWTO (2013).

Appendix 2-19. Domestic tourism arrivals

Country	Total			Coastal Mediterranean			Notes
	2010	2011	2012	2010	2011	2012	
Albania	425	445	238	213	223	119	
Algeria	5.185	5.484	5.704	2.593	2.742	2.852	
Bosnia and Herzegovina	644	668	714	64	67	71	
Croatia	5.438	6.010	6.056	3.915	4.327	4.360	
Cyprus	1.353	1.172	1.088	1.353	1.172	1.088	
France	194.126	198.784	199.577	34.943	35.781	35.924	
Greece	13.091	13.091	13.091	11.782	11.782	11.782	Last available data from 2009
Israel	7.655	7.655	7.655	6.124	6.124	6.124	Last available data from 2010
Italy	100.039	83.417	78.703	70.027	58.392	55.092	
Lebanon							na
Libya							na
Malta	353	320	334	353	320	334	
Montenegro	987	956	1.008	148	143	151	
Morocco	17.486	17.486	17.486	5.246	5.246	5.246	Last available data from 2010
Palestine	120	142	174	24	28	35	
Slovenia	1.987	2.044	2.065	497	511	516	
Spain	145.477	147.408	146.554	58.191	58.963	58.622	
Tunisia	3.429	3.429	4.115	3.086	3.086	3.704	
Turkey	68.373	65.854	64.922	27.349	26.342	25.969	
Egypt	9.027	8.180	8.300	3.159	2.863	2.905	
Syria	947	947	947	284	284	284	Last available data from 2009
Mediterranean Sea	**576.142**	**563.492**	**558.731**	**229.351**	**218.396**	**215.178**	

Source: UNWTO (2013).

Appendix 2-20. Economic performance of tourism and recreational activities in Mediterranean countries, in Million Euros

WTTC	Internal Tourism Consumption / Turnover 2012		GDP Direct Contribution / Gross Value Added 2012		GDP Total Contribution (all countries, all façades) 2012
Country	**Coastal**	**Total**	**Coastal**	**Total**	**Total**
Albania	812	1 624	300	599	2 109
Algeria	3 808	7 736	2 657	5 397	10 911
Bosnia and Herzegovina	78	779	27	273	995
Croatia	8 492	9 448	3 972	4 420	10 344
Cyprus	2 418	2 418	1 098	1 098	3 478
Egypt	4 527	19 298	3 226	13 752	30 271
France	27 610	148 400	14 456	77 700	197 600
Greece	19 200	20 700	11 130	12 000	30 300
Israel	7 771	10 297	3 246	4 300	14 355
Italy	81 090	118 100	43 806	63 800	161 200
Lebanon	4 895	7 259	2 095	3 107	8 395
Libya	1 100	1 287	697	815	1 592
Malta	1 285	1 285	937	937	1 776
Montenegro	86	776	37	336	664
Morocco	1 879	9 515	1 306	6 613	14 254
Palestine					
Slovenia	848	3 391	319	1 276	4 648
Spain	57 390	108 000	30 342	57 100	160 000
Syria	494	2 831	279	1 599	3 787
Tunisia	3 360	3 616	2 347	2 525	5 272
Turkey	23 645	45 500	12 956	24 932	67 321
Mediterranean Sea	**250.786**	**522.260**	**135.233**	**282.580**	**729.271**

Source: WTTC (2013)

Appendix 2-21. Social performance of tourism and recreational activities in Mediterranean countries, in thousands

WTTC	Direct Contribution of Tourism to Employment- Coastal	Direct Contribution of Tourism to Employment- Country	Total Contribution of Tourism to Employment- Coastal	Total Contribution of Tourism to Employment- Country
Country	**2012, in 000s jobs**			
Albania	25,8	51,5	92,1	184,1
Algeria	168,6	342,5	343,6	698,0
Bosnia and Herzegovina	2,1	21	7,7	76,5
Croatia	124,5	138,5	286,7	319,0
Cyprus	26,0	26	77,5	77,5
Egypt	322,6	1375,5	728,7	3.106,5
France	221,2	1189	544,1	2.924,5
Greece	306,6	330,5	639,1	689,0
Israel	61,5	81,5	190,2	252,0
Italy	754,9	1099,5	1.840,8	2.681,0
Lebanon	80,9	120	217,5	322,5
Libya	23,9	28	45,7	53,5
Malta	25,5	25,5	45,5	45,5
Montenegro	1,6	14,5	3,2	29,0
Morocco	163,7	829	357,6	1.811,0
Palestine				
Slovenia	7,9	31,5	26,4	105,5
Spain	475,1	894	1.430,0	2.691,0
Syria	35,0	200,5	85,4	489,0
Tunisia	201,6	217	421,8	454,0
Turkey	268,4	516,5	1.067,1	2.053,5
Mediterranean Sea	**3.297**	**7.532**	**8.450**	**19.063**

Source: WTTC （2013）

Appendix 2-22. Ratios applied to national data for the regional analysis of maritime transport

Country	Ratio Med / non Med (%)
Albania	100
Algeria	100
Bosnia and Herzegovina	100
Croatia	100
Cyprus	100
Egypt	33
France	31
Greece	100
Israel	94
Italy	100
Lebanon	100
Libya	100
Malta	100
Montenegro	100
Morocco	15
Palestine	100
Slovenia	100
Spain	41
Syria	100
Tunisia	100
Turkey	64

Appendix 2-23. List of Mediterranean ports and terminals

Western Mediterranean Ports	
DZA	15
ESP	48
FRA	34
GIB	1
ITA	89
MAR	2
MCO	1
TUN	7
Total Western Mediterranean	**197**
Adriatic Sea Ports	
ALB	4
GRC	2
HRV	65
ITA	40
MTG	11
SVN	4
Total Adriatic Sea	**126**
Ionian Sea and Central Mediterranean Ports	
GRC	32
ITA	35
LBY	18
MLT	5
TUN	10
Total Ionian Sea and Central Med	**100**
Aegean-Levantine Sea	
CYP	13
EGY	10
GRC	112
ISR	7
LBN	16
SYR	6
TUR	38
Total Aegean-Levantine Sea	**202**

Source: Keller et al. (2012).

Appendix 2-24. Total merchant fleet registered in Mediterranean countries (all façades)

Country	SHIP TYPE	2011	2012	2013
Albania	Total fleet	68	68	68
Algeria	Total fleet	104	109	111
Bosnia and Herzegovina	Total fleet			
Croatia	Total fleet	260	263	264
Cyprus	Total fleet	981	1008	1030
Egypt	Total fleet	377	381	384
France	Total fleet	540	553	555
Greece	Total fleet	1543	1541	1551
Israel	Total fleet	39	39	39
Italy	Total fleet	1467	1497	1506
Lebanon	Total fleet	54	54	50
Libya	Total fleet	93	91	91
Malta	Total fleet	1661	1772	1794
Montenegro	Total fleet	12	12	14
Morocco	Total fleet	81	81	85
Slovenia	Total fleet	7	8	8
Spain	Total fleet	512	519	522
Palestine	Total fleet			
Syria	Total fleet	72	64	63
Tunisia	Total fleet	59	58	59
Turkey	Total fleet	1315	1350	1365

Source：UNCTAD

Appendix 2-25. Deadweight tonnage (000 tons) of the total merchant fleet registered in Mediterranean countries (all façades)

Country	2011	2012	2013
Albania	93	93	93
Algeria	787	790	739
Bosnia & Herzegovina			
Croatia	1.971	2.177	2.269
Cyprus	31.425	32.324	31.706
Egypt	1.583	1.791	1.722
France	6.895	7.451	7.435
Greece	70.076	71.745	75.424
Israel	318	318	318
Italy	18.017	20.121	20.612
Lebanon	167	167	142
Libya	1.418	1.412	1.408
Malta	58.151	67.538	68.831
Montenegro	7	7	77
Morocco	127	127	128
Slovenia	1	1	1
Spain	2.556	2.579	2.572
Syria	253	178	169
Tunisia	409	361	367
Turkey	8.704	9.888	10.215

Source: UNCTAD

Appendix 2-26. Container transport in Mediterranean countries (all façades), in TEU

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Albania							33.127	46.798	68.780	86.875	91.827
Algeria	311.111						200.050	225.140	250.095	279.785	295.733
Bosnia and Herzegovina											
Croatia	18.218	23.853	42.326	76.550	94.223	112.906	145.040	168.761	130.740	137.048	144.860
Cyprus							377.037	416.970	353.913	349.357	360.652
Egypt	*1.708.990*	*1.336.040*	*1.579.530*	*2.959.895*	*4.031.114*	*5.372.832*	*5.181.581*	*6.099.218*	*6.250.443*	*6.709.053*	*6.565.502*
France	*2.997.774*	*3.276.150*	*3.565.963*	*3.954.173*	*4.000.847*	*4.259.470*	*4.984.492*	*4.671.989*	*4.490.583*	*5.346.800*	*5.362.900*
Greece	1.412.286	1.660.510	1.908.121	1.895.755	1.779.030	1.769.098	1.820.349	672.522	935.076	1.165.185	1.973.864
Israel	*1.378.259*	*1.461.000*	*1.548.080*	*1.431.510*	*1.712.339*	*1.773.498*	*1.957.328*	*2.089.900*	*2.033.000*	*2.281.552*	*2.411.600*
Italy	7.073.459	7.950.210	8.473.220	9.468.316	9.856.802	9.731.150	10.610.893	10.530.214	9.532.462	9.787.403	10.144.726
Lebanon	299.400					594.603	947.625	861.931	994.601	949.155	1.034.249
Libya							122.122	174.827	158.988	184.585	195.106
Malta	1.205.764	1.288.780	1.347.539	1.519.220	1.382.410	1.532.920	1.956.908	2.407.332	2.323.941	2.450.665	2.590.353
Montenegro											
Morocco	*346.724*		*517.549*	*560.682*				*919.360*	*1.222.000*	*2.058.430*	*2.175.761*
Palestine											
Slovenia							305.648	353.880	343.165	476.731	600.000
Spain	*6.156.351*	*6.664.100*	*7.363.964*	*8.270.437*	*9.170.557*	*10.033.089*	*13.346.028*	*13.461.304*	*11.803.192*	*12.613.016*	*13.163.828*
Syria							538.525	610.607	685.299	649.005	685.998
Tunisia							420.501	424.780	418.884	466.398	492.983
Turkey	*1.526.576*	*2.297.380*	*2.377.295*	*2.960.746*	*3.174.077*	*3.683.497*	*4.678.872*	*5.218.316*	*4.521.713*	*5.574.018*	*6.061.522*
Mediterranean Sea*	**16.662.199**	**17.955.797**	**19.471.421**	**21.877.878**	**23.083.932**	**24.972.240**	**31.039.177**	**31.316.087**	**29.478.196**	**32.045.818**	**34.309.277**

Source: World Bank

*Only Mediterranean façades. Regional ratios according to coastal length have been applied to national values for Egypt, France, Israel, Morocco, Spain and Turkey (see Appendix 2-22).

Appendix 2-27. Freight transport in EU Mediterranean countries, 000s tons loaded/ unloaded. NUTS 2 Statistical Aggregation

Country	GEO/TIME	2007	2008	2009	2010	2011	Mediterranean Sub-region
Greece	Voreia Ellada	29.338	25.841	23.625	23.333	19.709	Aegean-Levantine Sea
Greece	Anatoliki Makedonia, Thraki	1.615	1.799	1.605	1.702	1.528	Aegean-Levantine Sea
Greece	Kentriki Makedonia	18.056	15.511	14.213	15.812	13.357	Aegean-Levantine Sea
Greece	Thessalia	10.693	9.480	8.574	6.385	5.189	Aegean-Levantine Sea
Greece	Kentriki Ellada	36.814	35.567	33.554	33.630	35.721	Aegean-Levantine Sea
Greece	Ipeiros	4.480	3.557	3.003	2.819	2.600	Ionian Sea and Central Mediterranean
Greece	Ionia Nisia	1.604	1.350	1.101	680	680	Ionian Sea and Central Mediterranean
Greece	Dytiki Ellada	6.700	6.353	5.828	5.433	5.321	Ionian Sea and Central Mediterranean
Greece	Sterea Ellada	11.539	10.875	7.432	7.917	8.599	Aegean-Levantine Sea
Greece	Peloponnisos	14.165	14.697	17.173	17.381	19.222	Aegean-Levantine Sea
Greece	Attiki	47.521	43.695	40.817	39.179	45.654	Aegean-Levantine Sea
Greece	Nisia Aigaiou, Kriti	9.120	8.579	6.083	5.113	4.822	Aegean-Levantine Sea
Greece	Voreio Aigaio						Aegean-Levantine Sea
Greece	Notio Aigaio	4.743	4.814	2.939	1.983	1.849	Aegean-Levantine Sea
Greece	Kriti	4.395	3.782	3.158	3.131	2.974	Aegean-Levantine Sea
Spain	Cataluña	76.425	73.575	68.677	66.790	65.822	Western Mediterranean
Spain	Comunidad Valenciana	61.953	65.896	61.388	67.075	77.817	Western Mediterranean
Spain	Illes Balears	9.071	8.198	7.279	6.961	6.682	Western Mediterranean
Spain	Andalucía	103.331	97.460	83.214	88.834	81.317	Western Mediterranean
Spain	Región de Murcia	26.576	27.918	22.329	20.958	24.560	Western Mediterranean
Spain	Ciudad Autónoma de Ceuta (ES)	1.544	1.634	1.668	1.454	1.545	Western Mediterranean
France	Languedoc-Roussillon	5.144	4.876	4.731	5.350	5.603	Western Mediterranean
France	Provence-Alpes-Côte d'Azur	92.561	93.086	80.887	82.495	84.643	Western Mediterranean
France	Corse	3.188	4.127	4.351	1.518	1.717	Western Mediterranean
Croatia	Jadranska Hrvatska	23.739	24.351	19.102	19.033	16.485	Adriatic Sea
Italy	Liguria	80.871	79.719	73.170	70.226	71.850	Western Mediterranean

Country	GEO/TIME	2007	2008	2009	2010	2011	Mediterranean Sub-region
Italy	Veneto	34.933	32.985	30.423	34.382	34.705	Adriatic Sea
Italy	Friuli-Venezia Giulia	45.815	43.549	47.076	44.545	46.378	Adriatic Sea
Italy	Emilia-Romagna	27.008	30.075	23.848	22.186	22.281	Adriatic Sea
Italy	Toscana	41.864	39.400	32.859	33.475	31.399	Western Mediterranean
Italy	Marche	10.573	11.004	10.213	9.934	9.241	Adriatic Sea
Italy	Lazio	16.021	14.802	12.609	13.264	14.813	Western Mediterranean
Italy	Abruzzo	1.340	1.155	1.008	1.130	1.403	Adriatic Sea
Italy	Molise						Adriatic Sea
Italy	Campania	18.916	15.701	15.331	19.772	19.382	Western Mediterranean
Italy	Puglia	65.730	65.358	51.460	49.918	57.088	Adriatic Sea
Italy	Calabria	31.690	31.527	34.394	43.337	34.608	Ionian Sea and Central Mediterranean
Italy	Sicilia	87.941	82.157	69.214	84.703	84.619	Ionian Sea and Central Mediterranean
Italy	Sardegna	56.834	61.163	51.157	50.522	54.134	Western Mediterranean
Cyprus	Kypros	7.473	7.934	6.770	6.954	6.564	Aegean-Levantine Sea
Malta	Malta	3.228	3.373	3.369	3.795	3.321	Ionian Sea and Central Mediterranean
Slovenia	Zahodna Slovenija	15.805	16.499	13.322	14.591	16.198	Adriatic Sea
Turkey	Istanbul		36.484	33.046	45.838	40.274	Marmara
Turkey	Bati Marmara		17.171	18.715	23.501	35.494	Marmara
Turkey	Tekirdag, Edirne, Kirklareli		3.870	3.712	4.576	16.093	Marmara
Turkey	Balikesir, Çanakkale		13.415	15.069	18.999	19.410	Aegean-Levantine Sea
Turkey	Ege		53.662	44.735	51.786	53.490	Aegean-Levantine Sea
Turkey	Izmir		48.918	41.611	47.526	49.055	Aegean-Levantine Sea
Turkey	Aydin, Denizli, Mugla		4.839	3.213	4.380	4.561	Aegean-Levantine Sea
Turkey	Dogu Marmara		61.305	54.305	64.712	70.111	Marmara
Turkey	Bursa, Eskisehir, Bilecik		8.645	7.472	10.973	14.713	Marmara
Turkey	Kocaeli, Sakarya, Düzce, Bolu, Yalova		52.778	46.893	53.792	55.525	Marmara/Black Sea
Turkey	Akdeniz		104.949	114.952	120.813	122.604	Aegean-Levantine Sea

Country	GEO/TIME	2007	2008	2009	2010	2011	Mediterranean Sub-region
Turkey	Antalya, Isparta, Burdur		5.087	5.770	7.075	6.889	Aegean-Levantine Sea
Turkey	Adana, Mersin		19.569	20.368	24.218	25.440	Non-med
Turkey	Hatay, Kahramanmaras, Osmaniye		80.497	88.965	89.764	90.370	Aegean-Levantine Sea
Turkey	Bati Karadeniz		20.872	18.724	10.333	13.785	Non-med
Turkey	Zonguldak, Karabük, Bartin		14.018	12.134	2.880	6.271	Non-med
Turkey	Kastamonu, Çankiri, Sinop		331	270	262	272	Non-med
Turkey	Samsun, Tokat, Çorum, Amasya		6.638	6.435	7.279	7.304	Non-med
Turkey	Dogu Karadeniz		5.873	5.269	5.977	6.409	Non-med
Turkey	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane		5.873	5.269	5.977	6.409	Non-med

Source: Eurostat

Appendix 2-28. Southern and Eastern Mediterranean Countries (SEMC). Total freight flows in 000s tons

Country	Flow	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Algeria	Arrivals	23.472	23.191	24.861	26.509	27.005	29.490	33.861	33.069	34.197	377.001
Egypt	Arrivals	42.168	42.533	46.282	55.743	58.234	65.101	70.273	31.273	85.446	58.656
Morocco	Arrivals	32.097	31.759	34.148	37.773	36.990	41.697	41.557	39.395	43.113	
Tunisia	Arrivals	15.287	13.881	14.032	14.454	15.235	16.121	16.520	14.553	16.326	14.516
Israel	Arrivals	31.948	31.841	33.462	21.078	20.404	22.475	22.856	21.545	24.142	25.101
Lebanon	Arrivals	5.342	5.034	5.180	4.417	4.015	4.970	5.867,13	6.962,19	5.504,77	
Syria	Arrivals	9.866	9.422	13.098	37.029	16.886	16.174				
Algeria	Departures	84.598	91.842	94.120	100.493	99.973	100.814	94.279	87.342	83.695	80.545
Egypt	Departures	20.803	31.242	36.550	41.766	48.388	47.227	45.937	28.752	49.948	30.332
Morocco	Departures	24.891	24.355	27.355	29.735	29.833	31.136	26.158	20.341	26.123	
Tunisia	Departures	6.730	6.720	6.976	7.227	7.539	7.986	7.939	7.817	8.145	5.793
Israel	Departures	13.863	15.069	15.924	16.636	15.848	17.748	18.132	15.398	19.270	19.415
Lebanon	Departures	482	616	954	906	800	1.117	1.194,29	887,45	820,09	
Syria	Departures	2.555	2.473	833	2.664	3.346	4.265				

Source: Eurostat

Appendix 2-29. Passenger transport in EU Mediterranean countries, in 000s passengers. NUTS 2 Statistical Aggregation

GEO/TIME	2007	2008	2009	2010	2011	Mediterranean Sub-region
Voreia Ellada	2.974	3.260	3.257	2.930	2.892	Aegean-Levantine Sea
Anatoliki Makedonia, Thraki	1.820	1.899	1.842	1.705	1.697	Aegean-Levantine Sea
Kentriki Makedonia		220	220	205	226	Aegean-Levantine Sea
Thessalia	1.154	1.142	1.196	1.020	968	Aegean-Levantine Sea
Kentriki Ellada	12.001	11.323	11.022	10.261	10.092	Aegean-Levantine Sea
Ipeiros	2.683	2.631	2.741	2.726	2.567	Ionian Sea and Central Mediterranean
Ionia Nisia	3.582	3.491	3.578	3.329	3.211	Ionian Sea and Central Mediterranean
Dytiki Ellada	5.325	4.755	4.552	4.408	4.344	Ionian Sea and Central Mediterranean
Sterea Ellada	2.816	2.892	2.561	2.002	2.035	Aegean-Levantine Sea
Peloponnisos	313	214	289	315	332	Aegean-Levantine Sea
Attiki	31.982	31.471	30.228	29.024	26.946	Aegean-Levantine Sea
Nisia Aigaiou, Kriti	12.335	12.515	11.848	11.563	10.453	Aegean-Levantine Sea
Voreio Aigaio	1.309	1.386	1.212	1.195	1.143	Aegean-Levantine Sea
Notio Aigaio	8.428	8.394	8.027	7.810	6.884	Aegean-Levantine Sea
Kriti	2.847	2.983	2.859	2.831	2.691	Aegean-Levantine Sea
Cataluña	1.115	1.163	1.137	1.094	1.001	Western Mediterranean
Comunidad Valenciana	598	505	474	483	225	Western Mediterranean
Illes Balears	3.198	3.017	2.820	2.556	2.603	Western Mediterranean
Andalucía	6.657	6.409	6.038	5.945	3.457	Western Mediterranean
Región de Murcia					67	Western Mediterranean
Ciudad Autónoma de Ceuta (ES)	2.567	2.422	2.119	1.893	1.805	Western Mediterranean
Languedoc-Roussillon	226	210	216	201	170	Western Mediterranean
Provence-Alpes-Côte d'Azur	3.482	3.441	2.701	2.675	3.562	Western Mediterranean
Corse	3.407	3.827	4.000	4.610	3.042	Western Mediterranean
Hrvatska	12.108	12.578	12.964	12.565	13.311	Adriatic Sea
Liguria	2.703	2.596	3.511	2.670	1.939	Western Mediterranean
Veneto	498	487	841	354	288	Adriatic Sea
Friuli-Venezia Giulia						Adriatic Sea
Emilia-Romagna						Adriatic Sea
Toscana	7.181	9.225	8.374	6.717	6.934	Western Mediterranean
Marche	1.473	1.447	1.461	1.517	1.409	Adriatic Sea
Lazio	2.549	3.218	3.084	2.693	2.691	Western Mediterranean
Abruzzo						Adriatic Sea
Molise	241				206	Adriatic Sea
Campania	11.220	11.848	12.544	12.428	12.180	Western Mediterranean
Puglia	2.150	1.933	1.896	1.987	2.175	Adriatic Sea
Calabria	10.336	10.116	11.047	9.891	7.704	Ionian Sea and Central Mediterranean
Sicilia	14.183	14.905	13.816	14.492	11.679	Ionian Sea and Central Mediterranean

GEO/TIME	2007	2008	2009	2010	2011	Mediterranean Sub-region
Sardegna	10.503	9.902	10.441	9.190	8.801	Western Mediterranean
Kypros	0	0	0	0	0	Aegean-Levantine Sea
Kypros	0	0	0	0	0	Aegean-Levantine Sea
Malta	3.795	3.942	3.792	4.031	4.125	Ionian Sea and Central Mediterranean
Slovenija						Adriatic Sea
Zahodna Slovenija						Adriatic Sea
Istanbul		164	144	168	210	Marmara
Bati Marmara		107	120	78	110	Marmara
Tekirdag, Edirne, Kirklareli		12	15	2	0	Marmara
Balikesir, Çanakkale		108	134	78	110	Aegean-Levantine Sea
Ege		590	560	681	801	Aegean-Levantine Sea
Izmir		123	118	112	149	Aegean-Levantine Sea
Aydin, Denizli, Mugla		467	442	569	651	Aegean-Levantine Sea
Dogu Marmara		1	0	6	0	Marmara
Bursa, Eskisehir, Bilecik			0	6	0	Marmara
Kocaeli, Sakarya, Düzce, Bolu, Yalova		1	0			Marmara/Black Sea
Akdeniz		256	202	270	220	Aegean-Levantine Sea
Antalya, Isparta, Burdur		11	8	76	57	Aegean-Levantine Sea
Adana, Mersin		244	194	194	163	Non-med
Bati Karadeniz		35	25	27	26	Non-med
Zonguldak, Karabük, Bartin		20	21	20	25	Non-med
Samsun, Tokat, Çorum, Amasya		14	5	7	1	Non-med
Dogu Karadeniz		43	38	26	15	Non-med
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane		43	38	26	15	Non-med

Source: Eurostat

Appendix 2-30. Southern and Eastern Mediterranean Countries (SEMC). Total passenger flows in 000s passengers

GEO/TIME	Flow	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Algeria	Arrivals	323	366	405	447	454	430	360	328	324	308
Egypt	Arrivals		1.065	1.354	1.445	1.579	1.596	1.486	1.414	1.478	1.175
Morocco	Arrivals	1.508	1.734	1.876	2.031	2.028	1.898	1.834	1.935	1.207	
Tunisia	Arrivals	253	278	281	318	355	357	357	377	376	366
Israel	Arrivals				147	126	156	150	190	292	230
Lebanon	Arrivals	50	50	79	39	20	1	3	7	7	
Syria	Arrivals	6	3	7	15	9	4				
Algeria	Departures	273	317	363	399	425	426	359	314	310	290
Egypt	Departures		1.190	1.360	1.562	1.460	1.584	1.521	1.427	1.460	1.142
Morocco	Departures	1.385	1.603	1.772	1.875	1.843	1.836	1.795	1.859	1.434	
Tunisia	Departures	225	251	270	293	306	335	333	342	339	295
Israel	Departures				146	125	155	150	191	291	230
Lebanon	Departures	1	1	2	3	1	0	0	0	0	
Syria	Departures	5	3	7	14	9	4				

Source: Eurostat

Appendix 2-31. Maritime transport sub-sectors, data on economic (turnover and GVA in Million Euro) and social impacts (employment, in number of jobs)

COUNTRY	Sub-sector												TOTALS			
	Shipbuilding				Maritime Transport Services				Port services							
	Turnover	Prod value	GVA	N jobs	Turnover	Prod value	GVA	N jobs	Turnover	Prod value	GVA	N jobs	Turnover	Prod value	GVA	N jobs
Albania					169		113	1.301					169		113	1.301
Egypt					4.449		2.979	34.206					4.449		2.979	34.206
Israel					5.033		3.371	38.700					5.033		3.371	38.700
Montenegro					59		40	455					59		40	455
Tunisia					863		578	6.636					863		578	6.636
Morocco					1.678		1.124	12.905					1.678		1.124	12.905
B & H					3		2	19					3		2	19
Malta					253		169	1944					253		169	1944
Croatia	964	1.118	272	15.609	492	513	179	5.949	198	197	108	4.126	1.654	1.829	559	25.684
Cyprus	13	12	6	171	239	236	115	3.218	108	108	86	1.136	360	356	207	4.525
France	5.566	5.432	1.473	26.631	13.530	13.425	2.524	16.087	13.518	13.375	5.204	83.172	32.614	32.232	9.200	125.890
Greece	671	669	430	9.156	2.157	2.076	1.015	19.615	778	730	388	9.159	3.606	3.475	1.833	37.930
Italy	8.285	6.796	1.453	38.426	12.320	13.001	3.734	30.420	13.421	13.789	5.580	156.849	34.025	33.586	10.767	225.695
Slovenia	46	48	11	446	56	55	13	285	343	331	204	2.457	445	434	228	3.188
Spain	4.820	4.631	1.392	24.122	1.840	1.734	541	7.091	5.317	4.235	2.638	40.761	11.977	10.601	4.570	71.974
Turkey	2.247	2.207	539	39.726	2.360	2.358	626	22.418	1.322	1.335	696	34.351	5.930	5.900	1.861	96.495
Med Sea	**15.119**	**13.639**	**3.544**	**107.378**	**29.521**	**22.262**	**11.683**	**141.686**	**22.065**	**21.892**	**9.506**	**238.207**	**66.704**	**57.793**	**24.733**	**487.271**
Western Med	9.004	7.932	1.957	42.738	13.361	13.193	3.747	31.422	14.960	14.708	6.266	142.879	37.325	35.833	11.970	217.039
Adriatic Sea	2.584	2.458	558	23.356	3.120	3.038	1.056	13.789	3.091	3.148	1.372	36.384	8.795	8.644	2.987	73.529
Ionian Sea & Central Med	1.482	1.229	294	7.540	3.171	2.438	1.309	13.786	2.367	2.424	991	27.672	7.021	6.092	2.594	48.997
Aegean-Levant. Sea	2.049	2.020	734	33.744	9.868	3.592	5.571	82.689	1.647	1.613	877	31.272	13.564	7.225	7.181	147.705

Source: WTO (2010 and 2011) for countries highlighted in italics, and Eurostat (2009 and 2010) for the rest of countries.

Appendix 2-32. Estimations of total economic (in Million Euros) and social impacts (in number of jobs) of Maritime Transport sub-sectors, based on available data (Source: Eurostat

Appendix 2-31)

Note: Results are given in value for countries highlighted in italics, for which data were only available for the transport services sub-sector. Data regarding the shipbuilding and port services sub-sectors have been estimated from sub-regional averages (according to Mediterranean sub-regions) that were calculated based on countries for which data on the three sub-sectors were available.

COUNTRY / Sub-regions	Estimated data									TOTAL		
	Turnover			GVA			Employment					
	Shipbuilding	Transport Services	Port Services	Shipbuilding	Transport Services	Port Services	Shipbuilding	Transport Services	Port Services	Turnover	GVA	Employment
Albania	*140*	169	*168*	*60*	113	*147*	*2.204*	1.301	*3.433*	477	320	6.938
Egypt	*923*	4.449	*742*	*393*	2.979	*469*	*13.959*	34.206	*12.937*	6.114	3.841	61.102
Israel	*1.045*	5.033	*840*	*444*	3.371	*531*	*15.793*	38.700	*14.636*	6.918	4.346	69.129
Montenegro	*49*	59	*59*	*21*	40	*51*	*770*	455	*1.200*	167	112	2.424
Tunisia	*179*	863	*144*	*76*	578	*91*	*2.708*	6.636	*2.510*	1.186	745	11.854
Morocco	*1.131*	1.678	*1.879*	*587*	1.124	*1.879*	*17.552*	12.905	*58.678*	4.688	3.591	89.135
Bosnia & Herz.	*2*	3	*2*	*1*	2	*2*	*33*	19	*51*	7	5	103
Malta	*53*	253	*42*	*22*	169	*27*	*793*	1.944	*735*	348	218	3.473
Croatia	58%	30%	12%	49%	32%	19%	61%	23%	16%	1.654	559	25.684
Cyprus	4%	66%	30%	3%	55%	42%	4%	71%	25%	360	207	4.525
France	17%	41%	41%	16%	27%	57%	21%	13%	66%	32.614	9.200	125.890
Greece	19%	60%	22%	23%	55%	21%	24%	52%	24%	3.606	1.833	37.930
Italy	24%	36%	39%	13%	35%	52%	17%	13%	69%	34.025	10.767	225.695
Slovenia	10%	13%	77%	5%	6%	90%	14%	9%	77%	445	228	3.188
Spain	40%	15%	44%	30%	12%	58%	34%	10%	57%	11.977	4.570	71.974
Turkey	38%	40%	22%	29%	34%	37%	41%	23%	36%	5.930	1.861	96.495
Med Sea	**23%**	**44%**	**33%**	**14%**	**47%**	**38%**	**22%**	**29%**	**49%**	**70.315**	**26.802**	**550.622**
Western Med	**24%**	**36%**	**40%**	**16%**	**31%**	**52%**	**20%**	**14%**	**66%**	**37.880**	**12.394**	**230.144**
Adriatic Sea	**29%**	**35%**	**35%**	**19%**	**35%**	**46%**	**32%**	**19%**	**49%**	**9.215**	**3.269**	**81.220**
Ionian Sea and Central Med	**21%**	**45%**	**34%**	**11%**	**50%**	**38%**	**15%**	**28%**	**56%**	**7.335**	**2.757**	**54.074**
Aegean-Levantine Sea	**15%**	**73%**	**12%**	**10%**	**78%**	**12%**	**23%**	**56%**	**21%**	**15.885**	**8.382**	**185.184**

Appendix 2-33. Gas primary production (in 000s toe) in Mediterranean EU countries

GEO/TIME	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Greece	42	31	29	18	26	22	15	12	8	6
Spain	467	197	310	144	63	16	14	12	45	45
France	1.450	1.282	1.108	909	1.059	915	811	763	646	506
Croatia	1.732	1.789	1.796	1.865	2.217	2.362	2.194	2.196	2.215	2.007
Italy	11.976	11.372	10.615	9.886	8.992	7.949	7.580	6.563	6.885	6.920
Cyprus										0
Slovenia	5	4	4	3	3	3	3	3	6	2
Turkey	311	461	566	738	745	735	838	564	562	625

Source: Eurostat

Appendix 2-34. Oil production in Mediterranean EU countries (total petroleum products, in 000s tons)

GEO/TIME	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Greece	189	137	133	100	94	81	62	80	115	98
Spain	316	322	255	166	139	142	127	105	123	100
France	1.519	1.588	1.635	1.371	1.216	1.388	1.480	1.223	1.184	1.131
Croatia	1.185	1.125	1.068	1.004	973	925	863	807	740	684
Italy	5.805	5.888	5.729	6.362	6.327	6.609	5.996	5.162	5.882	5.780
Cyprus	0	0	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0	0
Slovenia	1	0	0	0	0	0	0	0	0	0
Turkey	2.420	2.351	2.251	2.258	2.160	2.134	2.160	2.402	2.508	2.370

Source: Eurostat

Appendix 2-35. Oil and gas prices

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
US dollars per million Btu		3,23	4,06	4,32	5,88	7,85	8,03	11,56	8,52	8,01	10,48	11,03
US dollars per toe		129,16	162,41	172,60	235,09	314,05	321,01	462,47	340,90	320,49	419,29	441,16
	$ 2011	164,84	202,65	209,79	276,37	357,66	355,46	493,17	364,82	337,45	427,97	441,16
	€ 2011	118,3	145,5	150,6	198,4	256,7	255,2	354,0	261,9	242,2	307,2	316,7

Source: BP World Review.
Conversion USD to €: 0,7178 (average 2011)