Deliverable Report

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Objective: The objective of this Deliverable is to analyze the social, technological, economic, ecological and political context of European aquaculture, with the focus on the selected species. Especially the macro-economic factors are analyzed that will affect the production chain of greater amberjack, Atlantic halibut, meagre, grey mullet, pikeperch and wreckfish.

Description: On the basis of literature and statistics. an overview of macro-economic factors on production and consumption is done. This document gives insights in the relevant scope for market entrance of the new species.

Deviations: The deliverable is submitted two (2) months later. In retrospect, it was too ambitious to deliver this report in 3 months from the start of the project.

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1 Introduction

Before market introduction of new fish species it is important to know what possible bottlenecks or stimulators are available in the market. These bottlenecks and stimulators can be found on several market levels. **Macroeconomics** is covering the economics dealing with the performance, structure, behaviour, and decision-making of an economy as a whole, rather than individual markets. This includes national economies. A PESTEL analysis is normally used to analyse these factors. In **Mesoeconomics** economic arrangements which are not based either on the microeconomics of buying and selling and supply and demand, nor on the macroeconomic reasoning of aggregate totals of demand, but on the importance of under what structures these forces play out, and how to measure these effects. This will be done in the Porter analysis force field analysis further on in WP 27. **Microeconomics** covers economics that studies the behaviour of individuals and small impacting players in making decisions on the allocation of limited resources (see scarcity). Microeconomics examines how decisions and behaviours affect the supply and demand for goods and services, which determines prices, and how prices, in turn, determine the quantity supplied and quantity demanded of goods and services. This will also be covered later on in WP 27.

In this Deliverable, D27.1, the objective is to execute a macro-economic external environmental analysis. With the PESTEL-model[1], the social, technological, economic, ecological and political context of the European aquaculture sector is analysed with a focus on the selected species. This validated methodology provides a framework of macro-environmental factors that affect or will affect the production chains of meagre, greater amberjack, wreck fish, Atlantic halibut, grey mullet and pike perch.

The PESTEL is done for both the five markets that are selected in this project and the five main production countries of the selected fish species. The selected markets are Spain, Italy, France, UK and Germany, whereas the main production countries are Spain, Italy, France, Norway and Greece. For each of the six chosen fish species, the relevant main production countries were selected. This selection process took into account the countries of origin of the SMEs joining Diversify (see Table 1). In this macro-economic analysis, only the macro-economic approach is used, so trade is not included.

Table 1: Fish species and production countries included in this study

Species	SMEs	Selected production countries
Meagre	MAREMAR (Spain), ARGO (Greece)	Spain, Greece, Italy
Greater Amberjack	ITICAL (Italy), CANEXMAR (Spain), FORKYS (Greece), ARGO (Greece)	Spain, Greece, Italy
Wreck fish	FORKYS (Greece)	Spain, Greece, Italy
Atlantic Halibut	SWH (Norway)	Norway
Grey mullet	ITICAL (Italy), DAG (Israel), GEI (Greece) and IRIDA (Greece)	Spain, Greece, Italy
Pike perch	ASIALOR (France)	France

[1] Gillespie, 2011. Foundations of Economics – additional chapter on business strategy. Oxford University Press.

1.1 Methodology

Many factors in the macro-environment will influence decision-making of managers of any organization, like in the European aquaculture sector. The methodology used in this research is the PESTEL-methodology, which distinguishes between Political, Economic, Social, Technological, Environmental and Legal factors of influence for decision-making. PESTEL enables managers, policy makers, traders and researchers to consider which factors are most likely to change and which ones will have the greatest impact as each actor must identify the key factors in his or her own environment. The factors may overlap since particular issues may fit in several categories. PESTEL provides long-lists with factors that might be relevant in the production chain, in this case of specific aquaculture species.

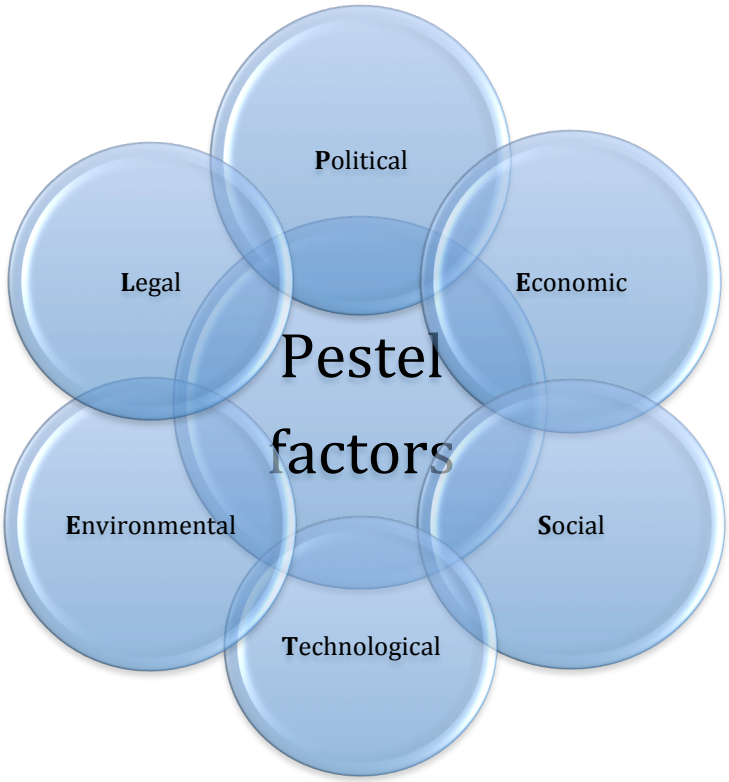

Figure 1: The PESTEL approach.

The PESTEL approach[2] distinguishes between:

Economic factors. These include interest rates, taxation changes, economic growth, inflation and exchange rates. These factors may have a major impact on a firm's behaviour. For example:

- higher interest rates may deter investment because it costs more to borrow
- a strong currency may make exporting more difficult because it may raise the price in terms of foreign currency
- inflation may provoke higher wage demands from employees and raise costs
- higher national income growth may boost demand for a firm's products

Political factors. These refer to government policies such as the degree of intervention in the economy; for our aim specifically in the import and export of aquaculture fish. What extent does governments subsidise firms? What are its priorities in terms of business support? Political decisions can impact on many vital areas

[2] Based on Gillespie (ibid)

for business such as the education of the workforce, the quality of the infrastructure of the economy such as the road and rail system.
Social factors. Changes in social trends can impact on the demand for a firm's products and the availability and willingness of individuals to work. Food and diet preferences, linked to social status or other factors (such as age) are changing and may affect the preference for certain aquaculture fish.
Technological factors. New technologies create new products and new processes. The logistics of aquaculture fish may become more efficient; the sanitary conditions may improve; which may have an impact on the costs of aquaculture production, transport, food safety etc.
Environmental factors. Environmental factors include the weather and climate change. Changes in temperature can impact on many industries. With major climate changes occurring due to global warming and with greater environmental awareness this external factor is becoming a significant issue for firms to consider. The growing desire to protect the environment is having an impact on many industries and the general move towards more environmentally friendly products and processes is affecting demand patterns and creating business opportunities. Sustainability in aquaculture is one of these issues that has received much attention.
Legal factors. These are related to the legal environment in which firms operate. Changes in trade-related legislation, in particular non-trade measures (NTMs), are important factors to consider.

All above information is to gathered by literature study and input from the species leaders in the Diversify project.

1.2 Aim of the study

The aim of this deliverable is to verify the most important PESTEL factors for the production process and export of the fish species mentioned, by using available up-to-date information sources.
To find the most important PESTEL factors, the long list of elements per factor has been checked for primary production and as selling market. A selection was made from the long-list. In table 2 the relevant factors for production and for sales in the selected EU-countries are presented.

Table 2: Relevant PESTEL-factors for aquaculture production

PESTEL	Relevant PESTEL-factors for aquaculture production of the new species	Relevant PESTEL-factors for the selected potential markets for the new species (UK, F, ES, It, D)
Political Factors	Aquaculture in politics in the EU affecting the production country now or in the future. EU aquaculture sector policies / subsidies / tax policies / environmental laws now and in the future and how this affects the production country . Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products in the production country	Government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption)
Econo-mic Factors	Economic development of the production country now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports) and inflation rate. Energy prices and/or dependence on imports now and in the future (General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.	Economic development of the country now and in the future. This includes economic growth, national income, consumption rate food of household income, interest rates (for investment), exchange rates (for imports and exports) and inflation rate The current production (fisheries and aquaculture) per species Developments in retail (concentration) and foodservice (concentration)
Social Factors	None	Consumers preferences: Dietary trends
Techno-logical Factors	Technological capability. Established techniques for hatchery production, grow out husbandry, feeds and culture systems now and in the future	
Environm ental Factors	Environmental issues that affect the farming of production of the specific species in the production country now and in the future, such as pollution and water quality now and in the future.	Sustainability: Consume awareness concerning sustainability Sustainability: Sustainability certification and eco labelling
Legal Factors	EU legal factors that affect how a company operates, its costs, and the demand in the production country, now and in the future. Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.	None

As indicated above, the factors presented have a different scope in terms of applicability. Some factors apply to more than one country, and some factors apply to several fish species. Figure 2 presents the range of validity of a PESTEL-factor.

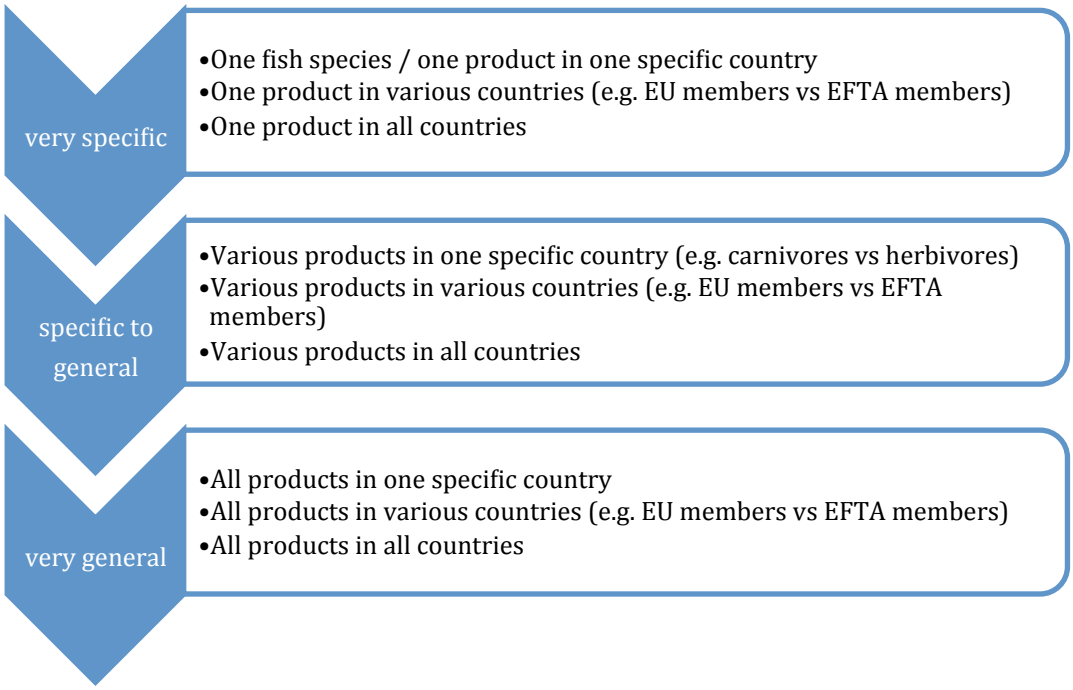

Figure 2: Range of validity of a PESTEL-factor.

In order to select the most relevant PESTEL-factors to analyse, we had to prioritize the factors in the long-list. We took both the likelihood of a change occurring and the impact of this change occurring into account. Many PESTEL-factors from the long-list have proven not to be relevant or are not expected to be very relevant in the future for production chains of aquaculture species considered in this study.

The aquaculture production chain also consists of trade, foodservice and retail-factors, but due to time-constraints it has not been possible to identify the most important PESTEL-factors in these specific chain components.

In the next chapter the PESTEL analysis of the production will be presented. In chapter 3 the PESTEL of the markets will be analysed.

2 Production

2.1 France – production of pike perch

Economic	**Economic development of France now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	Recovery remains slow amid sizeable budget deficits The incipient recovery is expected to firm up somewhat in the course of 2014 and in 2015, mainly supported by a timid pick-up in domestic demand, on the back of increasing confidence. Unemployment is set to decelerate and inflation to remain low, but no improvement in the current account balance is in sight. The general government balance is expected to improve only slightly in 2014. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 2.0% (2011); 0.0% (2012); Economic growth (forecast): 0.3% (2013); 1.0% (2014); 1.7% (2015)
	National income: € 2,001,398 million (2011); € 2,032,297 million (2012)
	Interest rates (for investment): 2,54 (2012); 2,20 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.2% (2012); Inflation rate (forecast): 1.0% (2013); 1.2% (2014); 1.2% (2015)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) states that the developments in the EU28 power sector have significant impacts on energy costs and electricity prices, in particular in the short term. Power generation costs significantly increase by 2020 relative to 2010, mainly as a consequence of higher investments due to the need for significant capital replacement and higher fuel costs (because of the large increase in international fossil fuel prices). Smaller components of the cost increase are national taxes and ETS allowance expenditures. In addition, there are the arithmetic effects of successful energy efficiency policies, which through curtailing electricity demand reduce the denominator for sharing out the electricity costs while the numerator is less affected due to the high share of fixed costs in electricity generation and supply. As a result, average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050, as the benefits, in terms of fuel cost savings, resulting from the enormous restructuring investments in electricity supply come increasingly to the fore. In addition, lower technology costs from technology progress and learning over time help contain electricity prices together with deceleration of gas price increase. Over time, the structure of costs slightly changes; capital intensive investments (RES and CCS) and increasing grid costs bring a decrease of the share of variable cost components and a corresponding increase in the capital cost components. See: EC (2013), http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm

	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	According to the Agricultural Outlook 2013-2022 of OECD-FAO (2013), commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Most crop prices are projected to fall in response to a rebound in production while reduced global livestock inventories allow only a limited supply response keeping meat prices high. Rising prices for both crop and livestock products are projected over the coming decade due to a combination of slower production growth and stronger demand, including for biofuels, and a supportive macroeconomic environment. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products (OECD-FAO, 2013).
Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future.**
	Since all cultures (cage, extensive pond and intensive RAS) require high quality water, it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. Water pollution is a major threat to good water quality. In case of the pike perch, the Water Framework Directive is germane. The EU Water Framework Directive sets goals for 2015 for chemical and ecological properties of ground and surface water (fresh and coast water). This directive is not only germane for the fresh water environment of the pike perch, but also for the euryhaline and marine environment. Most rivers flow into the sea and less contaminated rivers make cleaner seas. See for reports on the WFD implementation and the current state of water quality: http://ec.europa.eu/environment/water/participation/map_mc/map.htm
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	There is a large set of policies and rules to be applied within the EU market. This includes, but is not limited to: • business environment; • European Contract Law; • company taxation (harmonisation); • free movement of goods and services; • competition rules, such as antitrust, state aid control, merging regulations; • legislation on European standards; • manufacturing rules, such as pre-packaging, units of measurement, dealing with chemicals; • consumer protection and liability for defective products. Apart from these market rules, other EU policies and regulations also apply: • environmental obligations; • sustainable and responsible entrepreneurship; • labour issues (labour law, restructuring rules, anti-discrimination legislation); • cross-border mobility of workers; • workers' health and safety; • social responsibility (encouraging women entrepreneurs, migrants and ethnic minorities and corporate social responsibility). See: http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm

	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.
	French aquaculture is ruled by two main sets of legislation, clearly separating inland and marine aquaculture. Inland aquaculture, coupled with inland fisheries, is regulated by the Environmental Code (Code de l'Environnement), while marine aquaculture must abide by marine fisheries legislation, among which are Law No.97-1051 on Maritime Fisheries and Mariculture (Loi 97-1051 d'Orientation sur la Pêche Maritime et sur les Cultures Marines) (1997), and Decree of January 9th, 1852 on Maritime Fisheries (Décret du 9 janvier 1852 – Décret sur l'exercice de la pêche maritime) (1852, as amended). The latter explicitly extends the applicability of its provisions to the farming of marine animals and plants («l'élevage des animaux et la culture des végétaux marins»). See: http://www.fao.org/fishery/legalframework/nalo_france/en#tcNB00CB
Political	**Aquaculture in politics in the EU affecting France now or in the future.**
	As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund. The total envelope of the EMFF will be EUR 6,396 million for the 7-year period 2014–2020: • € 520 million for data collection • € 580 million for control and enforcement • € 192 million for compensation for outermost regions • € 71.1 million for Integrated Maritime Policy • € 45 million for storage aid • € 4,340.8 million for sustainable fisheries management and aquaculture under shared management (between the EU and member states), including: o modernisation of boats and engine renewal (with some safeguards) o withdrawal/scrapping of boats (subsidies available until the end of 2017) o temporary cessation of activity including in case of non-renewal of a fisheries agreement between the EU and a third country (with some safeguards) o support for young fishermen o support to a reformed CFP (discard ban, investment in more selective fishing gear, etc) o port infrastructure o aquaculture development o inland fishing o energy efficiency See: http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/
	EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects France.
	The European Commission intends to boost aquaculture through the Common Fisheries Policy reform, and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders: • reducing administrative burdens; • improving access to space and water; • increasing competitiveness; • exploiting competitive advantages due to high quality, health and environmental standards.

On the basis of the guidelines, the Commission and EU countries will collaborate to help increasing the sector's production and competitiveness. EU countries are asked to set up multiannual plans to promote aquaculture. The Commission will help with the coordination and exchange of best practices. See: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm

Aquaculture faces many challenges, according to the European Commission. Therefore, the priority must be to keep the sector economically viable, guarantee food safety and animal welfare, solve environmental problems and stimulate research. To attain these objectives, the Commission intends to implement nine actions:

- Increasing production. The Commission is proposing to redirect the aid granted by the Financial Instrument for Fisheries Guidance (FIFG). Research on new species and varieties will be promoted. Common standards must also be laid down for organic aquaculture.
- Improving the use of space. Closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines must all be developed. At the same time, integrated coastal zone management must take account of aquaculture in order to manage the use of coastal zones, which are already under all sorts of pressures from human activity.
- Developing the market, marketing and information. The Commission recommends more frequent use of official quality marks, promotional campaigns to improve the image of the sector and gathering reliable statistical information. Fish farmers will be encouraged to form marketing partnerships.
- Improving training. The Commission proposes to adapt training programmes to the needs of aquaculture. The role of women, who often occupy unskilled jobs, should be recognised. The Commission also recommends strengthening training programmes targeting women performing or wishing to perform management tasks. Economic decision-makers should take aquaculture into account as a factor in local development.
- Strengthening governance. The Commission is proposing to strengthen stakeholder participation in decision-making. At the same time, self-regulation and voluntary agreements such as codes of best practice and good conduct should be encouraged. The Community eco-management and audit scheme (EMAS) should also be introduced in the aquaculture sector.
- Guaranteeing product safety. Regarding public health, the Community legislation on food safety is in the process of being recast. The provisions on residues of antibiotics and dioxin in food will be strengthened. Research on the damage caused by the proliferation of toxic algal blooms and animal diseases will be promoted. Regarding animal health, European veterinary legislation needs to be updated. The problem of sea lice must be solved and the legislation on veterinary medicine amended.
- Animal welfare. The Commission could propose the adoption of standards to improve the welfare of farmed fish.
- Protecting the environment. The impact of waste must be reduced. Accordingly, the Commission intends to study the possibility of extending the rules on nitrate emissions to cover aquaculture, and to promote the fight against eutrophication.
- The impact on fisheries of catching wild fish to be reared in captivity should be studied.
- The EU should set up instruments to reduce the environmental impact of escapee, transgenic and alien species of fish. Specific criteria and guidelines must also be adopted for aquaculture environmental impact assessments.
- Solutions must be found to predation on aquaculture production by protected wild species.
- Strengthening research. National and Community programmes to support research activities will

	be crucial to the future of aquaculture. At Community level, instruments like the FIFG and the 6th Framework Programme for research and technological development will be mobilised. Research priorities will be defined. See for more information: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future.**
	The major bottlenecks for further expansion of **pike perch** culture today include (a) high sensitivity in stressors, handling and husbandry practices that result in high and sudden mortalities, (b) low larval survival (typical 5 – 10%) and high incidence of deformities, (c) lack of knowledge of the genetic variability of the used broodstocks. Overcoming these bottlenecks is very important to reduce production costs and, therefore, expand the aquaculture production of this species in the EU, and will be the objective of DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu

2.2 Greece – Production of greater amberjack, meagre, grey mullet and wreck fish

Economic	**Economic development of Greece now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	Greece shows the first signs of recovery. Recent data support expectations that Greece should return to growth in 2014. Confidence indicators continue to improve, whilst hard data releases suggest the first signs of recovery. Structural reforms undertaken in labour and product markets have underpinned improved competitiveness leading to expectations for strengthened exports and investment. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): -7.1% (2011); -6.4 (2012); Economic growth (forecast): -3.7% (2013); 0.6% (2014); 2.9% (2015)
	National income: € 208,532 million (2011); € 193,749 million (2012)
	Interest rates (for investment): 22.50 (2012); 10.05 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 1.0% (2012); Inflation rate (forecast): -0.9% (2013); -0.6% (2014); 0.2% (2015)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) states that the developments in the EU28 power sector have significant impacts on energy costs and electricity prices, in particular in the short term. Power generation costs significantly increase by 2020 relative to 2010, mainly as a consequence of higher investments due to the need for significant capital replacement and higher fuel costs (because of the large increase in international fossil fuel prices). Smaller components of the cost increase are national taxes and ETS allowance expenditures. In addition, there are the arithmetic effects of successful energy efficiency policies, which through curtailing electricity demand reduce the denominator for sharing out the electricity costs while the numerator is less affected due to the high share of fixed costs in electricity generation and supply. As a result, average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050, as the benefits, in terms of fuel cost savings, resulting from the enormous restructuring investments in electricity supply come increasingly to the fore. In addition, lower technology costs from technology progress and learning over time help contain electricity prices together with deceleration of gas price increase. Over time, the structure of costs slightly changes; capital intensive investments (RES and CCS) and increasing grid costs bring a decrease of the share of variable cost components and a corresponding increase in the capital cost components. See: EC (2013), http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm
	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	According to the Agricultural Outlook 2013-2022 of OECD-FAO (2013), commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Most crop prices are projected to fall in response to a rebound in production while reduced global livestock inventories allow only a limited supply response keeping meat prices high. Rising prices for both crop and livestock products are projected over the coming decade due to a combination of

	slower production growth and stronger demand, including for biofuels, and a supportive macroeconomic environment. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products (OECD-FAO, 2013).
Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future.**
	Since all cultures (cage, extensive pond and intensive RAS) require high quality water, it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. Water pollution is a major threat to good water quality. Two EU-directives are germane here: the Water Framework Directive and the Marine Strategy Framework Directive. The EU Water Framework Directive sets goals for 2015 for chemical and ecological properties of ground and surface water (fresh and coast water). This directive is not only germane for the fresh water environment of the pikeperch, but also for the euryhaline and marine environment. Most rivers flow into the sea and less contaminated rivers make cleaner seas. See for reports on the WFD implementation and the current state of water quality: http://ec.europa.eu/environment/water/participation/map_mc/map.htm The aim of the EU Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This applies to marine and euryhaline species (meagre, greater amberjack, wreck fish, Atlantic halibut and grey mullet).
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	There is a large set of policies and rules to be applied within the EU market. This includes, but is not limited to: • business environment; • European Contract Law; • company taxation (harmonisation); • free movement of goods and services; • competition rules, such as antitrust, state aid control, merging regulations; • legislation on European standards; • manufacturing rules, such as pre-packaging, units of measurement, dealing with chemicals; • consumer protection and liability for defective products. Apart from these market rules, other EU policies and regulations also apply: • environmental obligations; • sustainable and responsible entrepreneurship; • labour issues (labour law, restructuring rules, anti-discrimination legislation); • cross-border mobility of workers; • workers' health and safety; • social responsibility (encouraging women entrepreneurs, migrants and ethnic minorities and corporate social responsibility). See: http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm

	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.
	Aquaculture projects are strictly regulated by a permit system based on clearances issued by various agencies responsible for spatial planning and environmental protection, health protection, protection of antiquities, commercial fisheries, tourism, recreation, nature conservation and wildlife. The licensing authorities that coordinate the relevant powers of the competent agencies are the Ministry of Maritime Affairs, Islands and Fisheries/Directorate for Aquaculture and Inland Waters and the Ministry for the Environment, Energy and Climate Change. The aquaculture sector operates at a central-decentralized & regional administration, as the country's administrative system is divided into: (i) the central administration (Ministries) (ii) the decentralized administration (seven decentralized administrations) (iii) the regional authorities (13 regions) with 74 regional units and (iv) the local authorities (324 municipalities). The decision makers take also into account the perception of the local population to the project and the relationship of the proposed project to other projects operating in the area. In general the regional differences in policy and licenses are mainly granted on the basis of site-specific (spatial planning and environmental) criteria. From the environmental point of view, Greece has been divided into "sensitive" and "very sensitive" regions; fish farming is usually not permitted in the "very sensitive regions". In the present report, we discuss the legislation concerning site selection and the requirements, which must be met for the establishment and operation of intensive and semi-intensive aquaculture sites (ongrowing cage farm units, shellfish farms, land based farms, hatcheries with associated land-based facilities for marine and freshwater species etc.). See: http://www.fao.org/fishery/legalframework/nalo_greece/en
Political	**Aquaculture in politics in the EU affecting Greece now or in the future.**

	As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund.
	
	The total envelope of the EMFF will be EUR 6,396 million for the 7-year period 2014–2020:
	• € 520 million for data collection
	• € 580 million for control and enforcement
	• € 192 million for compensation for outermost regions
	• € 71.1 million for Integrated Maritime Policy
	• € 45 million for storage aid
	• € 4,340.8 million for sustainable fisheries management and aquaculture under shared management (between the EU and member states), including:
	  ○ modernisation of boats and engine renewal (with some safeguards)
	  ○ withdrawal/scrapping of boats (subsidies available until the end of 2017)
	  ○ temporary cessation of activity including in case of non-renewal of a fisheries agreement between the EU and a third country (with some safeguards)
	  ○ support for young fishermen
	  ○ support to a reformed CFP (discard ban, investment in more selective fishing gear, etc)
	  ○ port infrastructure
	  ○ aquaculture development
	  ○ inland fishing
	  ○ energy efficiency
	
	See: http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/

EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects Greece.

The European Commission intends to boost aquaculture through the Common Fisheries Policy reform, and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders:

- reducing administrative burdens;
- improving access to space and water;
- increasing competitiveness;
- exploiting competitive advantages due to high quality, health and environmental standards.

On the basis of the guidelines, the Commission and EU countries will collaborate to help increasing the sector's production and competitiveness. EU countries are asked to set up multiannual plans to promote aquaculture. The Commission will help with the coordination and exchange of best practices.
See: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm

Aquaculture faces many challenges, according to the European Commission. Therefore, the priority must be to keep the sector economically viable, guarantee food safety and animal welfare, solve environmental problems and stimulate research. To attain these objectives, the Commission intends to implement nine actions:

- Increasing production. The Commission is proposing to redirect the aid granted by the Financial Instrument for Fisheries Guidance (FIFG). Research on new species and varieties will be promoted. Common standards must also be laid down for organic aquaculture.
- Improving the use of space. Closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines must all be developed. At the same time, integrated coastal zone management must take account of aquaculture in order to manage the use of coastal zones, which are already under all sorts of pressures from human activity.
- Developing the market, marketing and information. The Commission recommends more frequent use of official quality marks, promotional campaigns to improve the image of the sector and gathering reliable statistical information. Fish farmers will be encouraged to form marketing partnerships.
- Improving training. The Commission proposes to adapt training programmes to the needs of aquaculture. The role of women, who often occupy unskilled jobs, should be recognised. The Commission also recommends strengthening training programmes targeting women performing or wishing to perform management tasks. Economic decision-makers should take aquaculture into account as a factor in local development.
- Strengthening governance. The Commission is proposing to strengthen stakeholder participation in decision-making. At the same time, self-regulation and voluntary agreements such as codes of best practice and good conduct should be encouraged. The Community eco-management and audit scheme (EMAS) should also be introduced in the aquaculture sector.
- Guaranteeing product safety. Regarding public health, the Community legislation on food safety is in the process of being recast. The provisions on residues of antibiotics and dioxin in food will be strengthened. Research on the damage caused by the proliferation of toxic algal blooms and animal diseases will be promoted. Regarding animal health, European veterinary legislation needs to be updated. The problem of sea lice must be solved and the legislation on veterinary medicine amended.
- Animal welfare. The Commission could propose the adoption of standards to improve the welfare of farmed fish.

	• Protecting the environment. The impact of waste must be reduced. Accordingly, the Commission intends to study the possibility of extending the rules on nitrate emissions to cover aquaculture, and to promote the fight against eutrophication. • The impact on fisheries of catching wild fish to be reared in captivity should be studied. • The EU should set up instruments to reduce the environmental impact of escapee, transgenic and alien species of fish. Specific criteria and guidelines must also be adopted for aquaculture environmental impact assessments. • Solutions must be found to predation on aquaculture production by protected wild species. • Strengthening research. National and Community programmes to support research activities will be crucial to the future of aquaculture. At Community level, instruments like the FIFG and the 6th Framework Programme for research and technological development will be mobilised. Research priorities will be defined. See for more information: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future**.
	The major bottlenecks for the incorporation of **greater amberjack** in the EU aquaculture industry include lack of (a) reliable reproduction and (b) production of adequate numbers of juveniles. In captivity, reproduction has been problematic (Kozul et al., 2001), but recently captive-reared broodstocks have reproduced after-hormonal treatments (Mylonas et al., 2004), and in some cases also spontaneously (Jerez et al., 2006). In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	With respect to the technological capability of the **meagre** industry, three principal bottlenecks are identified. Firstly, variable growth rates are reducing greatly yield (Duncan et al., 2013). A multidisciplinary approach is required in order to examine the role of genetics, nutrition – particularly dietary requirements during weaning, pre-ongrowing and in cage culture – feeding behavior and grow out husbandry. Secondly, the distribution of this fish only in specific areas in the Mediterranean region has resulted in the acquisition of broodstocks from a limited number of sources (mainly a hatchery in France), resulting perhaps in a limited genetic variation of the available broodstocks. This will have significant negative implications for the future initiation of breeding selection programs, which are necessary to move the industry to the next level of efficiency and production. Thirdly, the industry must address issues in fish health, emerging diseases, parasites (Toksen et al., 2007; Merella et al., 2009; Ternengo et al., 2010; Koyuncu et al., 2012) and the wide occurrence of Systemic Granulomas (Elkesh et al., 2012), which may stem from the fact that no diets have been developed for this fish. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Future growth of the **grey mullet** aquaculture is limited by a number of bottlenecks, which will be addressed in DIVERSIFY. Firstly, controlling the reproductive cycle and improving egg quality via

	broodstock management and nutrition is necessary not only for the production of robust larvae, but also for producing high value bottarga. Secondly, development of a larval rearing protocol is necessary to reduce early mortalities, size dispersion as well as increasing metamorphosis synchrony, which will lead to a supply of high quality juveniles. Thirdly, development of a sustainable, economical, fishmeal-free grow out feed is needed, which would perform well under different environmental conditions of temperature, pond type, and water quality, thus broadening the geographical range of grey mullet aquaculture in Europe. Based on the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Lack of reproduction control and of established larval rearing protocols are considered major bottlenecks preventing **wreckfish** aquaculture. Limited egg collection has been achieved from captive spawners using hormonal induction (Papandroulakis et al., 2008) or stripping of naturally maturing fish (Peletciro et al., 2011). Embryonic development and the early life stages have been described (Papandroulakis et al., 2008; Peletciro et al., 2011), indicating that the large egg size of this fish (-2 mm in diameter) may offer significant advantages for its larval rearing. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu

2.3 Italy - Production of greater amberjack, meagre, grey mullet and wreck fish

Economic	**Economic development of Italy now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	In Italy a slow recovery is underway. After contracting 1.9% in 2013, Italy's economy is expected to stage a slow recovery in 2014, driven by stronger external demand. As credit conditions ease, growth is expected to rise further in 2015. Unemployment peaked in late 2013 while inflation remains low. The government structural primary surplus – i.e. adjusted for the cycle and one-offs – is expected to stabilise at around 4½% of GDP over 2013-15. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0.5% (2011); -2.5% (2012); Economic growth (forecast): -1.9% (2013); 0.6% (2014); 1.2% (2015)
	National income: € 1,580,410 million (2011); € 1,567,010 million (2012)
	Interest rates (for investment): 5.49 (2012); 4.32 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 3.3% (2012); Inflation rate (forecast): 1.3% (2013); 0.9% (2014); 1.3% (2015)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) states that the developments in the EU28 power sector have significant impacts on energy costs and electricity prices, in particular in the short term. Power generation costs significantly increase by 2020 relative to 2010, mainly as a consequence of higher investments due to the need for significant capital replacement and higher fuel costs (because of the large increase in international fossil fuel prices). Smaller components of the cost increase are national taxes and ETS allowance expenditures. In addition, there are the arithmetic effects of successful energy efficiency policies, which through curtailing electricity demand reduce the denominator for sharing out the electricity costs while the numerator is less affected due to the high share of fixed costs in electricity generation and supply. As a result, average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050, as the benefits, in terms of fuel cost savings, resulting from the enormous restructuring investments in electricity supply come increasingly to the fore. In addition, lower technology costs from technology progress and learning over time help contain electricity prices together with deceleration of gas price increase. Over time, the structure of costs slightly changes; capital intensive investments (RES and CCS) and increasing grid costs bring a decrease of the share of variable cost components and a corresponding increase in the capital cost components. See: EC (2013), http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm
	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	According to the Agricultural Outlook 2013-2022 of OECD-FAO (2013), commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Most crop prices are projected to fall in response to a rebound in production while reduced global livestock inventories allow only a limited supply response keeping meat prices high. Rising prices for both crop and livestock

	products are projected over the coming decade due to a combination of slower production growth and stronger demand, including for biofuels, and a supportive macroeconomic environment. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products (OECD-FAO, 2013).
Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future.**
	Since all cultures (cage, extensive pond and intensive RAS) require high quality water, it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. Water pollution is a major threat to good water quality. Two EU-directives are germane here: the Water Framework Directive and the Marine Strategy Framework Directive. The EU Water Framework Directive sets goals for 2015 for chemical and ecological properties of ground and surface water (fresh and coast water). This directive is not only germane for the fresh water environment of the pike perch, but also for the euryhaline and marine environment. Most rivers flow into the sea and less contaminated rivers make cleaner seas. See for reports on the WFD implementation and the current state of water quality: http://ec.europa.eu/environment/water/participation/map_mc/map.htm The aim of the EU Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This applies to marine and euryhaline species (meagre, greater amberjack, wreck fish, Atlantic halibut and grey mullet).
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	There is a large set of policies and rules to be applied within the EU market. This includes, but is not limited to: • business environment; • European Contract Law; • company taxation (harmonisation); • free movement of goods and services; • competition rules, such as antitrust, state aid control, merging regulations; • legislation on European standards; • manufacturing rules, such as pre-packaging, units of measurement, dealing with chemicals; • consumer protection and liability for defective products. Apart from these market rules, other EU policies and regulations also apply: • environmental obligations; • sustainable and responsible entrepreneurship; • labour issues (labour law, restructuring rules, anti-discrimination legislation); • cross-border mobility of workers; • workers' health and safety; • social responsibility (encouraging women entrepreneurs, migrants and ethnic minorities and corporate social responsibility). See: http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm
	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.

	The National Fisheries and Aquaculture Plan for 2004 (Ministerial Decree of May 7th, 2004) stresses the necessity of increasing competitiveness, associations and pooling, environmental sustainability and products certification. Concerning the implementation of the above mentioned VI National Plan in the aquaculture sector, it is reported that the administrative powers concerning aquaculture management have been transferred to the Regional Authorities, while general guidance and coordination tasks are still performed by the Central Government, especially as regards the interaction with capture fisheries. In this concern, it is worth noting that Legislative Decree No.143 of 1997 (Decreto Legislativo 4 giugno 1997, No.143 – Conferimento alle Regioni delle Funzioni Amministrative in Materia di Agricoltura e Pesca e Riorganizzazione dell'Amministrazione Centrale) had already transferred to Regional Authorities most of the administrative functions related to agriculture and fisheries that were performed by the abolished Ministry of Agriculture, Food and Forest Resources (Ministero delle Risorse Agricole, Alimentari e Forestali). From a constitutional point of view, fisheries and aquaculture, as well as agriculture in general, are considered as matters of regional legislative competence, whereas navigation, land management and environmental resources are topics of concurrent legislative competence, between Regions and Central Government. Consequently, State legislation ought to establish guidelines and basic principles only on the latter, while leaving the former to the regional autonomy. However, the recent reform process of the fisheries and aquaculture legislation is being carried out by the Central Government, as required by the Parliament with Law No.57 of 2001 on the Opening and Regulation of Markets (Legge 5 marzo 2001, No.57 recante Disposizioni in Materia di Apertura e Regolazione dei Mercati) and Law No.38 of 2003 on Agriculture (Legge 7 marzo 2003, No.38 recante Disposizioni in Materia di Agricoltura). Although the 2001 Law only concerns the establishment of guidelines for the modernization of the sector, the 2003 Law goes further, delegating the Government to reorganize the whole matter "possibly" in a single Code on Agriculture, Fisheries and Aquaculture, within two years. See: http://www.fao.org/fishery/legalframework/nalo_italy/en
Political	**Aquaculture in politics in the EU affecting Italy now or in the future.**

	As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund.
	
	The total envelope of the EMFF will be EUR 6,396 million for the 7-year period 2014–2020:
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	• € 4,340.8 million for sustainable fisheries management and aquaculture under shared management (between the EU and member states), including:
	  ○ modernisation of boats and engine renewal (with some safeguards)
	  ○ withdrawal/scrapping of boats (subsidies available until the end of 2017)
	  ○ temporary cessation of activity including in case of non-renewal of a fisheries agreement between the EU and a third country (with some safeguards)
	  ○ support for young fishermen
	  ○ support to a reformed CFP (discard ban, investment in more selective fishing gear, etc)
	  ○ port infrastructure

- aquaculture development
- inland fishing
- energy efficiency

See: http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/

EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects Italy.

The European Commission intends to boost aquaculture through the Common Fisheries Policy reform, and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders:

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- improving access to space and water;
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On the basis of the guidelines, the Commission and EU countries will collaborate to help increasing the sector's production and competitiveness. EU countries are asked to set up multiannual plans to promote aquaculture. The Commission will help with the coordination and exchange of best practices.
See: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm

Aquaculture faces many challenges, according to the European Commission. Therefore, the priority must be to keep the sector economically viable, guarantee food safety and animal welfare, solve environmental problems and stimulate research. To attain these objectives, the Commission intends to implement nine actions:

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- Improving the use of space. Closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines must all be developed. At the same time, integrated coastal zone management must take account of aquaculture in order to manage the use of coastal zones, which are already under all sorts of pressures from human activity.
- Developing the market, marketing and information. The Commission recommends more frequent use of official quality marks, promotional campaigns to improve the image of the sector and gathering reliable statistical information. Fish farmers will be encouraged to form marketing partnerships.
- Improving training. The Commission proposes to adapt training programmes to the needs of aquaculture. The role of women, who often occupy unskilled jobs, should be recognised. The Commission also recommends strengthening training programmes targeting women performing or wishing to perform management tasks. Economic decision-makers should take aquaculture into account as a factor in local development.
- Strengthening governance. The Commission is proposing to strengthen stakeholder participation in decision-making. At the same time, self-regulation and voluntary agreements such as codes of best practice and good conduct should be encouraged. The Community eco-management and audit scheme (EMAS) should also be introduced in the aquaculture sector.
- Guaranteeing product safety. Regarding public health, the Community legislation on food safety is in the process of being recast. The provisions on residues of antibiotics and dioxin in food will be strengthened. Research on the damage caused by the proliferation of toxic algal blooms and animal

	diseases will be promoted. Regarding animal health, European veterinary legislation needs to be updated. The problem of sea lice must be solved and the legislation on veterinary medicine amended. • Animal welfare. The Commission could propose the adoption of standards to improve the welfare of farmed fish. • Protecting the environment. The impact of waste must be reduced. Accordingly, the Commission intends to study the possibility of extending the rules on nitrate emissions to cover aquaculture, and to promote the fight against eutrophication. • The impact on fisheries of catching wild fish to be reared in captivity should be studied. • The EU should set up instruments to reduce the environmental impact of escapee, transgenic and alien species of fish. Specific criteria and guidelines must also be adopted for aquaculture environmental impact assessments. • Solutions must be found to predation on aquaculture production by protected wild species. • Strengthening research. National and Community programmes to support research activities will be crucial to the future of aquaculture. At Community level, instruments like the FIFG and the 6th Framework Programme for research and technological development will be mobilised. Research priorities will be defined. See for more information: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future.**
	The major bottlenecks for the incorporation of **greater amberjack** in the EU aquaculture industry include lack of (a) reliable reproduction and (b) production of adequate numbers of juveniles. In captivity, reproduction has been problematic (Kozul et al., 2001), but recently captive-reared broodstocks have reproduced after-hormonal treatments (Mylonas et al., 2004), and in some cases also spontaneously (Jerez et al., 2006). In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	With respect to the technological capability of the **meagre** industry, three principal bottlenecks are identified. Firstly, variable growth rates are reducing greatly yield (Duncan et al., 2013). A multidisciplinary approach is required in order to examine the role of genetics, nutrition – particularly dietary requirements during weaning, pre-ongrowing and in cage culture – feeding behavior and grow out husbandry. Secondly, the distribution of this fish only in specific areas in the Mediterranean region has resulted in the acquisition of broodstocks from a limited number of sources (mainly a hatchery in France), resulting perhaps in a limited genetic variation of the available broodstocks. This will have significant negative implications for the future initiation of breeding selection programs, which are necessary to move the industry to the next level of efficiency and production. Thirdly, the industry must address issues in fish health, emerging diseases, parasites (Toksen et al., 2007; Merella et al., 2009; Ternengo et al., 2010; Koyuncu et al., 2012) and the wide occurrence of Systemic Granulomas (Elkesh et al., 2012), which may stem from the fact that no diets have been developed for this fish. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be

	altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Future growth of the **grey mullet** aquaculture is limited by a number of bottlenecks, which will be addressed in DIVERSIFY. Firstly, controlling the reproductive cycle and improving egg quality via broodstock management and nutrition is necessary not only for the production of robust larvae, but also for producing high value bottarga. Secondly, development of a larval rearing protocol is necessary to reduce early mortalities, size dispersion as well as increasing metamorphosis synchrony, which will lead to a supply of high quality juveniles. Thirdly, development of a sustainable, economical, fishmeal-free grow out feed is needed, which would perform well under different environmental conditions of temperature, pond type, and water quality, thus broadening the geographical range of grey mullet aquaculture in Europe. Based on the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Lack of reproduction control and of established larval rearing protocols are considered major bottlenecks preventing **wreckfish** aquaculture. Limited egg collection has been achieved from captive spawners using hormonal induction (Papandroulakis et al., 2008) or stripping of naturally maturing fish (Peletciro et al., 2011). Embryonic development and the early life stages have been described (Papandroulakis et al., 2008; Peletciro et al., 2011), indicating that the large egg size of this fish (-2 mm in diameter) may offer significant advantages for its larval rearing. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu

2.4 Norway – Production of Atlantic halibut

Economic	**Economic development of Norway now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate**.
	The expectation at the time of the autumn forecast that the growth dip registered end 2012 and early 2013 was temporary, has come true. However, the recovery was not as speedily as expected, in particular in fixed investment and exports. As a consequence, estimated GDP growth for 2013 has been revised downwards. The outlook for 2014 and 2015 is more favourable on the back of increased expectations for export growth. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 1.3% (2011); 2.9% (2012); Economic growth (forecast): 1.3% (2013); 2.7% (2014); 2.6% (2015)
	National income: € 389,149 million (2012); € 384,747 million (2013)
	Interest rates (for investment): n/a in Eurostat
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 0.4% (2012); Inflation rate (forecast): 1.5% (2013); 1.9% (2014); 1.9% (2015)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) states that power generation costs for member states of the European Union (EU28) significantly increase by 2020 relative to 2010. Average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050. See: EC (2013), http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm However, this does not apply to Norway, since it not a member state of the European Union. Moreover, Norway has abundant energy sources. In 2011, Norway was the eighth largest crude oil exporter in the world (at 78Mt), and the 9th largest exporter of refined oil (at 86Mt). It was also the world's third largest natural gas exporter (at 99bcm), having significant gas reserves in the North Sea. Norway also possesses some of the world's largest potentially exploitable coal reserves (located under the Norwegian continental shelf) on earth. On top of it all, electricity generation in Norway is almost entirely from hydroelectric power plants. Of the total electricity production in 2005 of 137.8 TWh, 136 TWh was from hydroelectric plants, 0.86 TWh was from thermal power, and 0.5 TWh was wind generated. In 2005 the total consumption was 125.8 TWh. See: http://en.wikipedia.org/wiki/Energy_in_Norway
	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	According to the Agricultural Outlook 2013-2022 of OECD-FAO (2013), commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Most crop prices are projected to fall in response to a rebound in production while reduced global livestock inventories allow only a limited supply response keeping meat prices high. Rising prices for both crop and livestock products are projected over the coming decade due to a combination of slower production growth and stronger demand, including for biofuels, and a supportive macroeconomic environment. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products (OECD-FAO, 2013).

Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future**.
	Since all cultures (cage, extensive pond and intensive RAS) require high quality water, it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. Water pollution is a major threat to good water quality. Two EU-directives are germane here: the Water Framework Directive and the Marine Strategy Framework Directive. To date, the latter does not apply to Norway. However, the implementation of this Directive may indirectly affect the marine water environment of Norway. The EU Water Framework Directive sets goals for 2015 for chemical and ecological properties of ground and surface water (fresh and coast water). This directive is not only germane for the fresh water environment of the pike perch, but also for the euryhaline and marine environment. Most rivers flow into the sea and less contaminated rivers make cleaner seas. See for reports on the WFD implementation and the current state of water quality: http://ec.europa.eu/environment/water/participation/map_mc/map.htm The aim of the EU Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This applies to marine and euryhaline species (meagre, greater amberjack, wreck fish, Atlantic halibut and grey mullet).
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	There is a large set of policies and rules to be applied within the EU market. This includes, but is not limited to: • business environment; • European Contract Law; • company taxation (harmonisation); • free movement of goods and services; • competition rules, such as antitrust, state aid control, merging regulations; • legislation on European standards; • manufacturing rules, such as pre-packaging, units of measurement, dealing with chemicals; • consumer protection and liability for defective products. Apart from these market rules, other EU policies and regulations also apply: • environmental obligations; • sustainable and responsible entrepreneurship; • labour issues (labour law, restructuring rules, anti-discrimination legislation); • cross-border mobility of workers; • workers' health and safety; • social responsibility (encouraging women entrepreneurs, migrants and ethnic minorities and corporate social responsibility). See: http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm
	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.
	The Aquaculture Act (2005) (the Act) regulates the management, control and development of

	aquaculture in both inland waters and marine waters (internal waters, territorial waters, the exclusive economic zone and on the continental shelf), as well as land based aquaculture. The Act covers aquaculture of any aquatic organism - from broodstock and hatchery production, to table fish production, as well as sea ranching. The purpose of the Act is "to promote the profitability and competitiveness of the aquaculture industry within the framework of a sustainable development and contribute to the creation of value on the coast." The Act regulates both commercial aquaculture, as well as aquaculture carried out for scientific or educational purposes. The Act establishes a licensing system, and broadly applies to issues like environmental standards, land utilisation, registration, transfer and mortgaging of licences, as well as control and enforcement. See: http://www.fao.org/fishery/legalframework/nalo_norway/en
Political	**Aquaculture in politics in the EU affecting Norway now or in the future.**

	As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund.
	
	The total envelope of the EMFF will be EUR 6,396 million for the 7-year period 2014–2020:
	• € 520 million for data collection
	• € 580 million for control and enforcement
	• € 192 million for compensation for outermost regions
	• € 71.1 million for Integrated Maritime Policy
	• € 45 million for storage aid
	• € 4,340.8 million for sustainable fisheries management and aquaculture under shared management (between the EU and member states), including:
	  ○ modernisation of boats and engine renewal (with some safeguards)
	  ○ withdrawal/scrapping of boats (subsidies available until the end of 2017)
	  ○ temporary cessation of activity including in case of non-renewal of a fisheries agreement between the EU and a third country (with some safeguards)
	  ○ support for young fishermen
	  ○ support to a reformed CFP (discard ban, investment in more selective fishing gear, etc)
	  ○ port infrastructure
	  ○ aquaculture development
	  ○ inland fishing
	  ○ energy efficiency
	
	See: http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/

	EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects Norway.
	The European Commission intends to boost aquaculture through the Common Fisheries Policy reform, and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders: • reducing administrative burdens; • improving access to space and water; • increasing competitiveness;

- exploiting competitive advantages due to high quality, health and environmental standards.

On the basis of the guidelines, the Commission and EU countries will collaborate to help increasing the sector's production and competitiveness. EU countries are asked to set up multiannual plans to promote aquaculture. The Commission will help with the coordination and exchange of best practices.
See: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm

Aquaculture faces many challenges, according to the European Commission. Therefore, the priority must be to keep the sector economically viable, guarantee food safety and animal welfare, solve environmental problems and stimulate research. To attain these objectives, the Commission intends to implement nine actions:

- Increasing production. The Commission is proposing to redirect the aid granted by the Financial Instrument for Fisheries Guidance (FIFG). Research on new species and varieties will be promoted. Common standards must also be laid down for organic aquaculture.
- Improving the use of space. Closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines must all be developed. At the same time, integrated coastal zone management must take account of aquaculture in order to manage the use of coastal zones, which are already under all sorts of pressures from human activity.
- Developing the market, marketing and information. The Commission recommends more frequent use of official quality marks, promotional campaigns to improve the image of the sector and gathering reliable statistical information. Fish farmers will be encouraged to form marketing partnerships.
- Improving training. The Commission proposes to adapt training programmes to the needs of aquaculture. The role of women, who often occupy unskilled jobs, should be recognised. The Commission also recommends strengthening training programmes targeting women performing or wishing to perform management tasks. Economic decision-makers should take aquaculture into account as a factor in local development.
- Strengthening governance. The Commission is proposing to strengthen stakeholder participation in decision-making. At the same time, self-regulation and voluntary agreements such as codes of best practice and good conduct should be encouraged. The Community eco-management and audit scheme (EMAS) should also be introduced in the aquaculture sector.
- Guaranteeing product safety. Regarding public health, the Community legislation on food safety is in the process of being recast. The provisions on residues of antibiotics and dioxin in food will be strengthened. Research on the damage caused by the proliferation of toxic algal blooms and animal diseases will be promoted. Regarding animal health, European veterinary legislation needs to be updated. The problem of sea lice must be solved and the legislation on veterinary medicine amended.
- Animal welfare. The Commission could propose the adoption of standards to improve the welfare of farmed fish.
- Protecting the environment. The impact of waste must be reduced. Accordingly, the Commission intends to study the possibility of extending the rules on nitrate emissions to cover aquaculture, and to promote the fight against eutrophication.
- The impact on fisheries of catching wild fish to be reared in captivity should be studied.
- The EU should set up instruments to reduce the environmental impact of escapee, transgenic and alien species of fish. Specific criteria and guidelines must also be adopted for aquaculture environmental impact assessments.

	• Solutions must be found to predation on aquaculture production by protected wild species. • Strengthening research. National and Community programmes to support research activities will be crucial to the future of aquaculture. At Community level, instruments like the FIFG and the 6th Framework Programme for research and technological development will be mobilised. Research priorities will be defined. See for more information: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future.**
	The bottlenecks for increased and stable production of **Atlantic halibut** are related to a steady supply of fry and a need to decrease the production time. The latter may be achieved with the recent establishment of "all female" juvenile production (Hendry et al., 2003; Babiak et al., 2012). In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu

2.5 Spain – Production of greater amberjack, meagre, grey mullet and wreck fish

Economic	**Economic development of Spain now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	In Spain the recovery becomes firmer while the rebalancing of the economy continues. The incipient economic recovery is forecast to get firmer in the coming quarters, backed by improved confidence and some easing of financing conditions. While the rebalancing of the economy is expected to continue, the growth contribution from external demand is expected to narrow. Employment is forecast to start growing, and the unemployment rate to retreat gradually, amidst continued moderation in unit labour costs. The budget deficit is set to narrow in 2014 but government debt will still rise. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0.1% (2011); -1.6% (2012); Economic growth (forecast): -1.2% (2013); 1.0% (2014); 1.7% (2015)
	National income: 1,046,327 million (2011); € 1,029,002 million
	Interest rates (for investment): 5. 85 (2012); 4.56 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.4% (2012); Inflation rate (forecast): 1.5% (2013); 0.3% (2014); 0.9% (2015)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) states that the developments in the EU28 power sector have significant impacts on energy costs and electricity prices, in particular in the short term. Power generation costs significantly increase by 2020 relative to 2010, mainly as a consequence of higher investments due to the need for significant capital replacement and higher fuel costs (because of the large increase in international fossil fuel prices). Smaller components of the cost increase are national taxes and ETS allowance expenditures. In addition, there are the arithmetic effects of successful energy efficiency policies, which through curtailing electricity demand reduce the denominator for sharing out the electricity costs while the numerator is less affected due to the high share of fixed costs in electricity generation and supply. As a result, average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050, as the benefits, in terms of fuel cost savings, resulting from the enormous restructuring investments in electricity supply come increasingly to the fore. In addition, lower technology costs from technology progress and learning over time help contain electricity prices together with deceleration of gas price increase. Over time, the structure of costs slightly changes; capital intensive investments (RES and CCS) and increasing grid costs bring a decrease of the share of variable cost components and a corresponding increase in the capital cost components. See: EC (2013), http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm
	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	According to the Agricultural Outlook 2013-2022 of OECD-FAO (2013), commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Most crop prices are projected to fall in response to a rebound in production while reduced global livestock inventories allow only a limited

	supply response keeping meat prices high. Rising prices for both crop and livestock products are projected over the coming decade due to a combination of slower production growth and stronger demand, including for biofuels, and a supportive macroeconomic environment. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products (OECD-FAO, 2013).
Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future.**
	Since all cultures (cage, extensive pond and intensive RAS) require high quality water, it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. Water pollution is a major threat to good water quality. Two EU-directives are germane here: the Water Framework Directive and the Marine Strategy Framework Directive. The EU Water Framework Directive sets goals for 2015 for chemical and ecological properties of ground and surface water (fresh and coast water). This directive is not only germane for the fresh water environment of the pike perch, but also for the euryhaline and marine environment. Most rivers flow into the sea and less contaminated rivers make cleaner seas. See for reports on the WFD implementation and the current state of water quality: http://ec.europa.eu/environment/water/participation/map_mc/map.htm The aim of the EU Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This applies to marine and euryhaline species (meagre, greater amberjack, wreck fish, Atlantic halibut and grey mullet).
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	There is a large set of policies and rules to be applied within the EU market. This includes, but is not limited to: • business environment; • European Contract Law; • company taxation (harmonisation); • free movement of goods and services; • competition rules, such as antitrust, state aid control, merging regulations; • legislation on European standards; • manufacturing rules, such as pre-packaging, units of measurement, dealing with chemicals; • consumer protection and liability for defective products. Apart from these market rules, other EU policies and regulations also apply: • environmental obligations; • sustainable and responsible entrepreneurship; • labour issues (labour law, restructuring rules, anti-discrimination legislation); • cross-border mobility of workers; • workers' health and safety; • social responsibility (encouraging women entrepreneurs, migrants and ethnic minorities and corporate social responsibility). See: http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm

	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.
	The legal framework for the regulation and promotion of aquaculture in Spain consists of several legal instruments, amongst which outstand the Constitution of Spain, Law N°20/1942 for Promotion and Conservation of Riverine Fisheries (Ley Nº 20/1942 de Fomento y Conservación de la Pesca Fluvial) , Law Nº 23 /1984 on Marine Aquaculture (Ley Nº 23 /1984 de Cultivos Marinos) and Law Nº 22/1988 on the Coastline (Ley Nº 22/1988 de Costas) . The main objectives of these legal instruments are: • Law Nº 23/1984 on Marine Aquaculture: "the regulation and ordering of marine aquaculture within the national territory, the coastal land zone, estuaries, coastal lagoons either temporarily or permanently open to the sea, territorial sea, and exclusive economic zone; either regarding public or private property, without affecting the competence and faculties assumed by the Autonomous Communities". • Law Nº 22/1988 on the Coastline: "the boundaries, protection, use and patrol of the public sea border, particularly the marine coastline". Notwithstanding, in agreement with the dispositions of Article 148.1.11 of the Constitution of Spain, the Autonomous Communities exert exclusive competence in inland waters, harvesting of shellfish, aquaculture, hunting and riverine fisheries. It may be pointed out that the following Autonomous Communities have taken responsibility on aquaculture and shellfish harvesting: Galicia, Andalucía, Valencia, Islas Baleares, Cantabria, País Vasco, Cataluña, Asturias, Murcia, Islas Canarias, Aragón, Castilla-León, Castilla La Mancha y Extremadura . The legal instruments issued by the National Government on marine and inland aquaculture regulation have a general and supplementary character, since as has been mentioned, Autonomous Communities apply their own regulation. See: http://www.fao.org/fishery/legalframework/nalo_spain/en
Political	**Aquaculture in politics in the EU affecting Spain now or in the future.**

	As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund.
	
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	• € 4,340.8 million for sustainable fisheries management and aquaculture under shared management (between the EU and member states), including:
	  ○ modernisation of boats and engine renewal (with some safeguards)
	  ○ withdrawal/scrapping of boats (subsidies available until the end of 2017)
	  ○ temporary cessation of activity including in case of non-renewal of a fisheries agreement between the EU and a third country (with some safeguards)
	  ○ support for young fishermen
	  ○ support to a reformed CFP (discard ban, investment in more selective fishing gear, etc)
	  ○ port infrastructure
	  ○ aquaculture development
	  ○ inland fishing

- energy efficiency

See: http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/

EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects Spain.

The European Commission intends to boost aquaculture through the Common Fisheries Policy reform, and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders:

- reducing administrative burdens;
- improving access to space and water;
- increasing competitiveness;
- exploiting competitive advantages due to high quality, health and environmental standards.

On the basis of the guidelines, the Commission and EU countries will collaborate to help increasing the sector's production and competitiveness. EU countries are asked to set up multiannual plans to promote aquaculture. The Commission will help with the coordination and exchange of best practices. See: http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm

Aquaculture faces many challenges, according to the European Commission. Therefore, the priority must be to keep the sector economically viable, guarantee food safety and animal welfare, solve environmental problems and stimulate research. To attain these objectives, the Commission intends to implement nine actions:

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- Improving the use of space. Closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines must all be developed. At the same time, integrated coastal zone management must take account of aquaculture in order to manage the use of coastal zones, which are already under all sorts of pressures from human activity.
- Developing the market, marketing and information. The Commission recommends more frequent use of official quality marks, promotional campaigns to improve the image of the sector and gathering reliable statistical information. Fish farmers will be encouraged to form marketing partnerships.
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- Strengthening governance. The Commission is proposing to strengthen stakeholder participation in decision-making. At the same time, self-regulation and voluntary agreements such as codes of best practice and good conduct should be encouraged. The Community eco-management and audit scheme (EMAS) should also be introduced in the aquaculture sector.
- Guaranteeing product safety. Regarding public health, the Community legislation on food safety is in the process of being recast. The provisions on residues of antibiotics and dioxin in food will be strengthened. Research on the damage caused by the proliferation of toxic algal blooms and animal diseases will be promoted. Regarding animal health, European veterinary legislation needs to be updated. The problem of sea lice must be solved and the legislation on veterinary medicine

	amended. • Animal welfare. The Commission could propose the adoption of standards to improve the welfare of farmed fish. • Protecting the environment. The impact of waste must be reduced. Accordingly, the Commission intends to study the possibility of extending the rules on nitrate emissions to cover aquaculture, and to promote the fight against eutrophication. • The impact on fisheries of catching wild fish to be reared in captivity should be studied. • The EU should set up instruments to reduce the environmental impact of escapee, transgenic and alien species of fish. Specific criteria and guidelines must also be adopted for aquaculture environmental impact assessments. • Solutions must be found to predation on aquaculture production by protected wild species. • Strengthening research. National and Community programmes to support research activities will be crucial to the future of aquaculture. At Community level, instruments like the FIFG and the 6th Framework Programme for research and technological development will be mobilised. Research priorities will be defined. See for more information: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future.**
	The major bottlenecks for the incorporation of **greater amberjack** in the EU aquaculture industry include lack of (a) reliable reproduction and (b) production of adequate numbers of juveniles. In captivity, reproduction has been problematic (Kozul et al., 2001), but recently captive-reared broodstocks have reproduced after-hormonal treatments (Mylonas et al., 2004), and in some cases also spontaneously (Jerez et al., 2006). In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	With respect to the technological capability of the **meagre** industry, three principal bottlenecks are identified. Firstly, variable growth rates are reducing greatly yield (Duncan et al., 2013). A multidisciplinary approach is required in order to examine the role of genetics, nutrition – particularly dietary requirements during weaning, pre-ongrowing and in cage culture – feeding behavior and grow out husbandry. Secondly, the distribution of this fish only in specific areas in the Mediterranean region has resulted in the acquisition of broodstocks from a limited number of sources (mainly a hatchery in France), resulting perhaps in a limited genetic variation of the available broodstocks. This will have significant negative implications for the future initiation of breeding selection programs, which are necessary to move the industry to the next level of efficiency and production. Thirdly, the industry must address issues in fish health, emerging diseases, parasites (Toksen et al., 2007; Merella et al., 2009; Ternengo et al., 2010; Koyuncu et al., 2012) and the wide occurrence of Systemic Granulomas (Elkesh et al., 2012), which may stem from the fact that no diets have been developed for this fish. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Future growth of the **grey mullet** aquaculture is limited by a number of bottlenecks, which will be

	addressed in DIVERSIFY. Firstly, controlling the reproductive cycle and improving egg quality via broodstock management and nutrition is necessary not only for the production of robust larvae, but also for producing high value bottarga. Secondly, development of a larval rearing protocol is necessary to reduce early mortalities, size dispersion as well as increasing metamorphosis synchrony, which will lead to a supply of high quality juveniles. Thirdly, development of a sustainable, economical, fishmeal-free grow out feed is needed, which would perform well under different environmental conditions of temperature, pond type, and water quality, thus broadening the geographical range of grey mullet aquaculture in Europe. Based on the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu
	Lack of reproduction control and of established larval rearing protocols are considered major bottlenecks preventing **wreckfish** aquaculture. Limited egg collection has been achieved from captive spawners using hormonal induction (Papandroulakis et al., 2008) or stripping of naturally maturing fish (Peletciro et al., 2011). Embryonic development and the early life stages have been described (Papandroulakis et al., 2008; Peletciro et al., 2011), indicating that the large egg size of this fish (-2 mm in diameter) may offer significant advantages for its larval rearing. These bottlenecks will be addressed in DIVERSIFY. In connection with the previous, the established techniques for hatchery production, growout husbandry, feeds and culture systems may need to be altered. See: DIVERSIFY (2013) en http://www.diversifyfish.eu

3 Market

3.1 France

Economic	**Economic development of France now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	The recovery of the French economy remains slow amid sizeable budget deficits. The incipient recovery is expected to firm up somewhat in the course of 2014 and in 2015, mainly supported by a timid pick-up in domestic demand, on the back of increasing confidence. Unemployment is set to decelerate and inflation to remain low, but no improvement in the current account balance is in sight. The general government balance is expected to improve only slightly in 2014. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 2.0% (2011); 0.0% (2012); Economic growth (forecast): 0.3% (2013); 1.0% (2014); 1.7% (2015)
	National income: € 2,001,398 million (2011); € 2,032,297 million (2012)
	Interest rates (for investment): 2.54 (2012); 2.20 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.2% (2012); Inflation rate (forecast): 1.0% (2013); 1.2% (2014); 1.2% (2015)
	Domestic production (fisheries)
	Meagre: 715 (2011); 955 (2012) tonnes; € 3,834,207 (2011); € 5,552,266 (2012)
	Greater amberjack: 5 (2011); 3 (2012) tonnes; € 29,540 (2011); € 21,371 (2012)
	Wreck fish: 2 (2011); 7 (2012) tonnes; € 30,273 (2011); € 115,478 (2012)
	Atlantic halibut: 2 (2011); 6 (2012) tonnes; € 15,502 (2011); € 54,624 (2012)
	Grey mullet: *Mugilidae nei* 817 (2011); n/a (2012) € 1,490,708 (2011); n/a (2012) *Mugil cephalus* n/a (2011); 123 (2012) tonnes; n/a (2011); € 144,999 (2012)
	Pike perch: 2 (2011); 2 (2012) tonnes; € 15,749 (2011); € 21,048 (2012)
	Domestic production (aquaculture)
	Meagre: 555.1 (2008); 417.9 (2009); 400* (2010); 400* (2011) tonnes * FAO estimate from available sources of information
	Pike perch: n/a (2008); n/a (2009); n/a (2010); n/a (2011)
	Developments in retail (concentration) and foodservice (concentration).
	Retail concentration generally refers to the market-share belonging to the top retail firms present in a regional market, as a percentage of the total. Wagenberg et al. (2011) have reported the concentration of the top 3 food retailers (2008-2011):

	Market share (%) 52.4: Carrefour (22.7); ITM (14.9); Leclerc (14.8) Outlet share (%) 67.3: Casino (38.4); Francap (16.4); ITM (12.5) This can be characterised as medium concentration.
Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	The National Programme of Nutrition & Health (PNNS), set up by the French Ministry of Health and the National Institute for Prevention and Health Education (INPES; Institut National de Prévention et d'Éducation pour la Santé), stresses the importance of healthy eating, emphasising that scientific studies say a varied and balanced diet is an important part of good health. It also mentions that eating is one of life's greatest pleasures, and that eating well means not only being satisfied, but also eating good and tasty food in a friendly atmosphere (see the PNNS website: www.mangerbouger.fr). The PNNS has defined nine rules (9 repères) for healthy eating. Two of these rules are related to fish consumption (Dooren & Kramer, 2012): - Meat, fish and eggs: once or twice a day. Fish at least twice a week (100g per serving). - Fat products: limited (includes butter and cream). Vegetable oils, oily fish and nuts are preferred, as are cooking methods requiring little fat.
Environmental	**Sustainability: Consumer awareness concerning sustainability**
	Consumers are becoming more critically aware concerning the level of sustainability of fisheries. Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market. The retail segment in particular is increasingly focussing its attention on the story underpinning the supplied products. Retailers are aiming to assure customers that the product they sell has been responsibly sourced. Source: CBI Trend Mapping: Frozen Tuna Products
	Sustainability: Sustainability certification and eco labelling
	Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe. In terms of cultured fish, Global GAP and the recently introduced Aquaculture Stewardship Council (ASC) are set to dominate the market. The mainstream markets for fish are increasingly demanding certified fish products, particularly supermarkets in north-western Europe. By now, more than 100 ASC certified tilapia and pangasius products are sold on the European market. However, countries in southern and eastern Europe have not yet made sustainability a market access requirement. Source: CBI Trend Mapping: Frozen White Fish Products
Social	**Consumers preferences: Dietary trends**
	Convenience food Owing to the pressures of time and consumers' unfamiliarity with preparing fish, there is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. Consumers interested in these products prefer meals that are quick to prepare and healthy (see also the trend for healthy food). The demand for convenience foods is expected to increase still further over the long term. Source: CBI Trend Mapping: Frozen White Fish Products Healthy food Fish is marketed as a healthy product in northern, western and southern Europe. Although the hype surrounding the healthiness of fish is now past its peak, the nutritional value of white fish products is set to continue as one of the main factors in fish marketing. The trend may no longer be a novelty, but the results from it are now perceived as facts. Source: CBI Trend Mapping: Frozen White Fish Products

3.2 Italy

Economic	**Economic development of Italy now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	In Italy a slow recovery is underway. After contracting 1.9% in 2013, Italy's economy is expected to stage a slow recovery in 2014, driven by stronger external demand. As credit conditions ease, growth is expected to rise further in 2015. Unemployment peaked in late 2013 while inflation remains low. The government structural primary surplus – i.e. adjusted for the cycle and one-offs – is expected to stabilise at around 4½% of GDP over 2013-15. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0.5% (2011); -2.5% (2012); Economic growth (forecast): -1.9% (2013); 0.6% (2014); 1.2% (2015)
	National income: € 1,580,410 million (2011); € 1,567,010 million (2012)
	Interest rates (for investment): 5.49 (2012); 4.32 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 3.3% (2012); Inflation rate (forecast): 1.3% (2013); 0.9% (2014); 1.3% (2015)
	Domestic production (fisheries)
	Meagre: - (2011); - (2012)
	Greater amberjack: 482 (2011); 342 (2012) tonnes; € 5,731,636 (2011); € 3,914,463 (2012)
	Wreck fish: - (2011); - (2012)
	Grey mullet: *Mugilidae nei* 3,568 (2011); 4,874 (2012) tonnes; € 6,777,726 (2011); € 5,421,769 (2012) *Mugil cephalus* - (2011); - (2012)
	Domestic production (aquaculture)
	Meagre: *Marine* 39.5 (2008); 36 (2009); n/a (2010); n/a (2011) tonnes *Brackishwater* 69.5 (2008); 66 (2009); 45.4 (2010); 150* (2011) tonnes * FAO estimate from available sources of information
	Grey mullet: *Mullets nei* 233 (2008); 231 (2009); 92.2 (2010); 90* (2011) * FAO estimate from available sources of information
	Developments in retail (concentration) and foodservice (concentration).
	Retail concentration generally refers to the market-share belonging to the top retail firms present in a regional market, as a percentage of the total. Wagenberg et al. (2011) have reported the concentration of the top 3 food retailers (2008-2011): Market share (%) 38.3: Coop (15.6); Conad (12.3); Selex (10.5) Outlet share (%) 40.9: Crai (14.3); Conad (13.9); Interdis (12.6) This can be characterised as low concentration.

Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	Trends such as low/no carbohydrate products and low-fat diets feature prominently in many magazines, and have attracted many Italian followers. Fish and seafood products are ideally suited to these trends, and to further encourage increased consumption at home, the Italian government is running campaigns promoting the health benefits of seafood. One example is the online campaign sponsored by the Ministry for Agricultural, Food and Forestry Policies, "Mangia Bene Cresci Meglio" (Eat Well, Grow Better), which aims to educate Italian consumers about the importance of a healthy diet (AAFC , 2013).
Environmental	**Sustainability: Consumer awareness concerning sustainability**
	Consumers are becoming more critically aware concerning the level of sustainability of fisheries. Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market. The retail segment in particular is increasingly focussing its attention on the story underpinning the supplied products. Retailers are aiming to assure customers that the product they sell has been responsibly sourced. Source: CBI Trend Mapping: Frozen Tuna Products
	Sustainability: Sustainability certification and eco labelling
	Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe. In terms of cultured fish, Global GAP and the recently introduced Aquaculture Stewardship Council (ASC) are set to dominate the market. The mainstream markets for fish are increasingly demanding certified fish products, particularly supermarkets in north-western Europe. By now, more than 100 ASC certified tilapia and pangasius products are sold on the European market. However, countries in southern and eastern Europe have not yet made sustainability a market access requirement. Source: CBI Trend Mapping: Frozen White Fish Products
Social	**Consumers preferences: Dietary trends**
	Convenience food Owing to the pressures of time and consumers' unfamiliarity with preparing fish, there is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. Consumers interested in these products prefer meals that are quick to prepare and healthy (see also the trend for healthy food). The demand for convenience foods is expected to increase still further over the long term. Source: CBI Trend Mapping: Frozen White Fish Products Healthy food Fish is marketed as a healthy product in northern, western and southern Europe. Although the hype surrounding the healthiness of fish is now past its peak, the nutritional value of white fish products is set to continue as one of the main factors in fish marketing. The trend may no longer be a novelty, but the results from it are now perceived as facts. Source: CBI Trend Mapping: Frozen White Fish Products

3.3 Spain

Economic	**Economic development of Spain now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	The recovery becomes firmer while the rebalancing of the economy continues The incipient economic recovery is forecast to get firmer in the coming quarters, backed by improved confidence and some easing of financing conditions. While the rebalancing of the economy is expected to continue, the growth contribution from external demand is expected to narrow. Employment is forecast to start growing, and the unemployment rate to retreat gradually, amidst continued moderation in unit labour costs. The budget deficit is set to narrow in 2014 but government debt will still rise. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0.1% (2011); -1.6% (2012); Economic growth (forecast): -1.2% (2013); 1.0% (2014); 1.7% (2015)
	National income: 1,046,327 million (2011); € 1,029,002 million
	Interest rates (for investment): 5.85 (2012); 4.56 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.4% (2012); Inflation rate (forecast): 1.5% (2013); 0.3% (2014); 0.9% (2015)
	Domestic production (fisheries)
	Meagre: - (2011); - (2012)
	Greater amberjack: 309 (2011); 212 (2012) tonnes; € 2,610,487 (2011); € 1,969,570 (2012)
	Wreck fish: 802 (2011); 220 (2012) tonnes; € 10,410,298 (2011); € 2,692,173 (2012)
	Atlantic halibut: 129 (2011); 138 (2012) tonnes; € 399,498 (2011); € 503,798 (2012)
	Grey mullet: *Mugilidae nei* 816 (2011); 423 (2012); € 1,034,229 (2011); € 469,551 (2012) *Mugil cephalus* - (2011); - (2012)
	Domestic production (aquaculture)
	Meagre: *Marine – Atlantic* n/a (2008); 0.03 (2009); 23.1 (2010); n/a (2011) tonnes *Marine – Mediterranean* 1,117 (2008); 1,320.9 (2009); 1,815.6 (2010); 989.78 (2011) tonnes *Brackishwater - Atlantic* 6 (2008); 27.4 (2009); 14.2 (2010); 16.19 (2011) tonnes
	Greater amberjack: 0 (2008); 0.71 (2009); 2.1 (2010); 2.21 (2011)
	Grey mullet: *Mullets nei – marine* - (2008); 26.95 (2009); 39 (2010); 37.99 (2011) *Mullets nei – brackishwater* 119 (2008); 106.59 (2009); 88.9 (2010); 118.69 (2011)
	Developments in retail (concentration) and foodservice (concentration).
	Retail concentration generally refers to the market-share belonging to the top retail firms present in a regional market, as a percentage of the total. Wagenberg et al. (2011) have reported the concentration of the top 3 food retailers (2008-2011): Market share (%) 50.4: El Corte Inglés (18.7); Mercadona (17.40); Carrefour (14.3)

	Outlet share (%) 38.3: DIA (13.7); Covirán (13.2); Eroski (11.5) This can be characterised as low to medium concentration.
Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	In 2001, Aranceta et al. published the first dietary guidelines for Spain, in the form of a food pyramid. These were based on the findings of a group of Spanish experts (Sociedad Española de Nutrición Comunitaria). The pyramid was updated in 2004. Based on this pyramid, the Fundación Dieta Mediterránea developed the Mediterranean Diet Pyramid (MDP). The advice it contains is supported by the Spanish Ministry of Agriculture, Food and the Environment (Ministerio de Agricultura, Alimentación y Medio Ambiente). The MDP promotes weekly consumption of at least 2 servings of fish/seafood (serving size 125-150g) (Dooren & Kramer, 2012).
Environmental	**Sustainability: Consumer awareness concerning sustainability**
	Consumers are becoming more critically aware concerning the level of sustainability of fisheries. Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market. The retail segment in particular is increasingly focussing its attention on the story underpinning the supplied products. Retailers are aiming to assure customers that the product they sell has been responsibly sourced. Source: CBI Trend Mapping: Frozen Tuna Products
	Sustainability: Sustainability certification and eco labelling
	Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe. In terms of cultured fish, Global GAP and the recently introduced Aquaculture Stewardship Council (ASC) are set to dominate the market. The mainstream markets for fish are increasingly demanding certified fish products, particularly supermarkets in north-western Europe. By now, more than 100 ASC certified tilapia and pangasius products are sold on the European market. However, countries in southern and eastern Europe have not yet made sustainability a market access requirement. Source: CBI Trend Mapping: Frozen White Fish Products

Social	**Consumers preferences: Dietary trends**
	Convenience food Owing to the pressures of time and consumers' unfamiliarity with preparing fish, there is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. Consumers interested in these products prefer meals that are quick to prepare and healthy (see also the trend for healthy food). The demand for convenience foods is expected to increase still further over the long term. Source: CBI Trend Mapping: Frozen White Fish Products Healthy food Fish is marketed as a healthy product in northern, western and southern Europe. Although the hype surrounding the healthiness of fish is now past its peak, the nutritional value of white fish products is set to continue as one of the main factors in fish marketing. The trend may no longer be a novelty, but the results from it are now perceived as facts. Source: CBI Trend Mapping: Frozen White Fish Products

3.4 Germany

Economic	**Economic development of the Germany now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	Germany has accelerated growth. Economic growth is expected to accelerate, powered by domestic demand. Favourable financing conditions and dissipating uncertainty should lead to a gradual recovery in investment in equipment after disappointing outcomes in 2012-13, while low interest rates and a robust labour market should further support private consumption and housing investment. The general government budget is forecast to remain balanced and the gross debt-to-GDP ratio to decline. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0,7% (2012); Economic growth (forecast): 0.4% (2013); 1.8% (2014); 2.0% (2015)
	National income: € 2,666,400 million (2012); € 2,737,600 million (2013)
	Interest rates (for investment): 1,50 (2012); 1,57 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.1% (2012); Inflation rate (forecast): 1.6% (2013); 1.4% (2014); 1.4% (2015)
	Domestic production (fisheries)
	Atlantic halibut: 15 (2010); 12 (2011) tonnes; € 2,769 (2010); € 3,304 (2011)
	Grey mullet: *Mugilidae nei* 3 (2010); 2 (2011) tonnes; € 230 (2010); € 130 (2011); *Mugil cephalus* - (2010); - (2011)
	Pike perch: 126 (2010); 182 (2011) tonnes; € 162,351 (2010); € 324,113 (2011)
	Domestic production (aquaculture)
	Pike perch: 3 (2008); 3 (2009); 5 (2010); 39 (2011) tonnes
	Developments in retail (concentration) and foodservice (concentration).
	Retail concentration generally refers to the market-share belonging to the top retail firms present in a regional market, as a percentage of the total. Wagenberg et al. (2011) have reported the concentration of the top 3 food retailers (2008-2011): Market share (%) 57.0: Edeka (21.3); Rewe (19.7); Lidl (15.6) Outlet share (%) 66.8: Edeka (29.0); Rewe (26.7); Tengelmann (11.1) This can be characterised as medium concentration.
Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	While Germany may lag behind some other Western European countries in terms of fish consumption, fish and seafood is becoming more popular with Germans, thanks in part to the increasing focus on health issues, particularly obesity and cardiac health. More and more Germans are switching from meat to fish, as meat prices have risen over the past few years and fish prices have fallen, according to the Federal Trade Association of the German Fishing Industry (AAFC , 2012).

Environmental	**Sustainability: Consumer awareness concerning sustainability**
	Consumers are becoming more critically aware concerning the level of sustainability of fisheries. Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market. The retail segment in particular is increasingly focussing its attention on the story underpinning the supplied products. Retailers are aiming to assure customers that the product they sell has been responsibly sourced. Source: CBI Trend Mapping: Frozen Tuna Products
	Sustainability: Sustainability certification and eco labelling
	Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe. In terms of cultured fish, Global GAP and the recently introduced Aquaculture Stewardship Council (ASC) are set to dominate the market. The mainstream markets for fish are increasingly demanding certified fish products, particularly supermarkets in north-western Europe. By now, more than 100 ASC certified tilapia and pangasius products are sold on the European market. However, countries in southern and eastern Europe have not yet made sustainability a market access requirement. Source: CBI Trend Mapping: Frozen White Fish Products
Social	**Consumers preferences: Dietary trends**
	Convenience food Owing to the pressures of time and consumers' unfamiliarity with preparing fish, there is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. Consumers interested in these products prefer meals that are quick to prepare and healthy (see also the trend for healthy food). The demand for convenience foods is expected to increase still further over the long term. Source: CBI Trend Mapping: Frozen White Fish Products Healthy food Fish is marketed as a healthy product in northern, western and southern Europe. Although the hype surrounding the healthiness of fish is now past its peak, the nutritional value of white fish products is set to continue as one of the main factors in fish marketing. The trend may no longer be a novelty, but the results from it are now perceived as facts. Source: CBI Trend Mapping: Frozen White Fish Products

3.5 United Kingdom

Economic	**Economic development of the UK now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	In the UK the recovery takes hold, fiscal imbalances still sizeable. Growth finally took hold in the UK in 2013 with strong domestic demand supressing the negative effect of weak export performance. UK GDP grew 1.9% in 2013 and is expected to grow by 2.5% in 2014 and 2.4% in 2015. Inflation declined throughout the year as did unemployment. Some progress has also been made on the fiscal side, but the debt ratio has yet to peak. See: EU (2014) European Economic Forecast; Winter 2014
	Economic growth (past): 0.3% (2012); Economic growth (forecast): 1.9% (2013); 2.5% (2014); 2.4% (2015)
	National income: € 1,770,910 million (2011); € 1,932,702 million (2012)
	Interest rates (for investment): 1.74 (2012); 2.03 (2013)
	Exchange rates (imports/exports): EUR/GBP (past): 0.81087 (2012); 0.84926 (2013); EUR/GBP (forecast): 0.83639 (2014); 0.83639 (2015); EUR/NOK (past): 7.4751 (2012); 7.8067 (2013); EUR/NOK (forecast): 8.4053 (2014); 8.4053 (2015)
	Inflation rate (past): 2.8% (2012); Inflation rate (forecast): 2.6% (2013); 2.0% (2014); 2.0% (2015)
	Domestic production (fisheries)
	Wreck fish: 1 (2011); 0 (2012) tonnes; € 15,012 (2011); € 1,859 (2012)
	Atlantic halibut: 100 (2011); 67 (2012) tonnes; € 1,080,933 (2011); € 856,024 (2012)
	Grey mullet: *Mugilidae nei* 199 (2011); 178 (2012) tonnes; € 497,221 (2011); € 408,386 (2012) *Mugil cephalus* - (2011); - (2012)
	Domestic production (aquaculture)
	Not applicable
	Developments in retail (concentration) and foodservice (concentration).
	Retail concentration generally refers to the market-share belonging to the top retail firms present in a regional market, as a percentage of the total. Wagenberg et al. (2011) have reported the concentration of the top 3 food retailers (2008-2011): Market share (%) 55.6: Tesco (27.8); Sainsbury (15.5); Asda (12.4) Outlet share (%) 42.1: Nisa (18.8); Spar (12.0); Co-op (11.3) This can be characterised as low to medium concentration.
Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	The official recommendation from the UK Department of Health (DH) is to eat at least two portions of fish (140 g each) per week, one of which should be oil-rich (www.nhs.uk/Livewell/Goodfood/Pages/fishshellfish.aspx). The current UK recommendation is thought to relate specifically to fin fish (DH personal communication) but shellfish such as prawns, crab, mussels and squid also provide modest amounts of long chain n-3 fatty acids; many consumers as well as health professionals may not be aware of this (Weichselbaum,

	2013).
Environmental	**Sustainability: Consumer awareness concerning sustainability**
	Consumers are becoming more critically aware concerning the level of sustainability of fisheries. Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market. The retail segment in particular is increasingly focussing its attention on the story underpinning the supplied products. Retailers are aiming to assure customers that the product they sell has been responsibly sourced. Source: CBI Trend Mapping: Frozen Tuna Products
	Sustainability: Sustainability certification and eco labelling
	Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe. In terms of cultured fish, Global GAP and the recently introduced Aquaculture Stewardship Council (ASC) are set to dominate the market. The mainstream markets for fish are increasingly demanding certified fish products, particularly supermarkets in north-western Europe. By now, more than 100 ASC certified tilapia and pangasius products are sold on the European market. However, countries in southern and eastern Europe have not yet made sustainability a market access requirement. Source: CBI Trend Mapping: Frozen White Fish Products
Social	**Consumers preferences: Dietary trends**
	Convenience food Owing to the pressures of time and consumers' unfamiliarity with preparing fish, there is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. Consumers interested in these products prefer meals that are quick to prepare and healthy (see also the trend for healthy food). The demand for convenience foods is expected to increase still further over the long term. Source: CBI Trend Mapping: Frozen White Fish Products Healthy food Fish is marketed as a healthy product in northern, western and southern Europe. Although the hype surrounding the healthiness of fish is now past its peak, the nutritional value of white fish products is set to continue as one of the main factors in fish marketing. The trend may no longer be a novelty, but the results from it are now perceived as facts. Source: CBI Trend Mapping: Frozen White Fish Products

4 Conclusions

Having carried out an analysis on the most important PESTEL factors for the production process and export of the six fish species, these are our main findings:

PESTEL for production

Political factors

- As from the start of 2014, the new Common Fisheries Policy has been in effect. At the end of January 2014, the EU institutions also reached a political agreement on the European Maritime Fisheries Fund (EMFF), the policy's financial instrument for 2014-2020. This fund will finance the new fisheries policy and support the sector to adapt to the new policy objectives such as the discard ban. Moreover, it will also support Europe's blue growth policy through the maritime strand of the fund.
- The European Commission intends to boost aquaculture through the Common Fisheries Policy reform and has published Strategic Guidelines presenting common priorities and general objectives at EU level. Four priority areas have been identified in consultation with all relevant stakeholders: reducing administrative burdens, improving access to space and water, increasing competitiveness, and exploiting competitive advantages due to high quality, health and environmental standards.

Economic factors

- Current domestic production (capture and aquaculture) of the six fish species is generally low in all importing markets (Italy, France, Spain, Germany and United Kingdom).
- The economic outlook for 2014 and 2015 generally is moderately positive to positive for both the production countries and the importing markets. The countries that were in dire straits, in particular Greece, Spain and Italy, show the first signs of recovery. In France, recovery remains slow, whereas Germany, United Kingdom and Norway have favourable economic growth expectations.
- Power generation costs significantly increase by 2020 relative to 2010. Average electricity price in the period 2010-2020 increases by 31%. Beyond 2020, average electricity prices remain broadly stable up to 2035 and then are projected to moderately decrease up to 2050.
- Commodity prices are currently high by historical levels. In the first years of the Outlook, crop and livestock prices are expected to diverge, reflecting different supply situations. Meat, fish and biofuel prices are projected to rise more strongly than primary agricultural products.

Social factors

- Not applicable

Technological factors

- Based on the outcomes in DIVERSIFY the established techniques for hatchery production, growout husbandry, feeds and culture systems may alter. This relates to the rearing environment, the feeding system, the diet, husbandry practices, environmental factors, the domestication level and geographical origin, among other things.

Environmental factors

- All cultures require high quality water, so it is crucial that the water quality of both surface and groundwater and the marine environment meets high standards. In Greece, France and Italy, around 25 to 40% of the surface water had a good or better ecological status in 2009. Since EU member states are committed to implement measures under the EU Water Framework Directive (WFD), the water quality is expected to improve dramatically towards 2015 in France and Italy. Ground water quality was moderate in Italy (53% of the ground water had a good or better ecological status in 2009) and good in France (89%) and is expected to improve due to the WFD. Greece has no plans to improve water quality. For Spain, no relevant data were available.
- Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe.

Legal factors

- There is a large set of EU policies and rules to be applied, both regarding the EU market and other European issues. The rules and policies can be both limiting, what with competition rules and consumer protection, and stimulating, such as free movement of goods and services and cross-border mobility of workers.
- All production countries have some kind of domestic legislation regarding aquaculture, on the one hand establishing guidelines and basic principles and on the other hand promoting the profitability and competitiveness of the aquaculture industry.

PESTEL for consumption markets

Political factors

- Governments in France, Italy, Spain, Germany and the United Kingdom are running campaigns promoting the health benefits of fish and seafood.

Economic factors

- Retail concentration is low to medium in Italy and medium to high in France, Spain, Germany and the United Kingdom. This means that the retail market in these countries is dominated by a few large retailers.

Social factors

- There is an increasing demand for ready-to-eat and easy-to-cook, value-added fish products such as microwave products or fish fingers. The demand for convenience foods is expected to increase still further over the long term.
- Fish is marketed as a healthy product in northern, western and southern Europe.

Technological factors

- Not applicable

Environmental factors

- Consumer awareness will continue to grow over the short to long term, and the responsible sourcing of fish will become even more important for exporters wishing to export to the European market.
- Sustainability certification for fish species is becoming increasingly important and is expected to become a market access requirement throughout Europe.

Legal factors

- Not applicable

5 Sources

5.1 Production

Economic	**Economic development of [this country] now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	Economic growth: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, GDP and main components - Current prices (nama_gdp_c)
	National income: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, GDP and main components - Volumes (nama_gdp_k)
	Interest rates (for investment): http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, EMU convergence criterion series - annual data (irt_lt_mcby_a)
	Exchange rates (imports/exports): http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Euro/ECU exchange rates - annual data (ert_bil_eur_a)
	Inflation rate: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, HICP (2005 = 100) - annual data (average index and rate of change) (prc_hicp_aind)
	Energy prices and/or dependence on imports now and in the future.
	EC (2013) EU energy, transport and GHG emissions – trends to 2050; reference scenario 2013: http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm Energy in Norway: http://en.wikipedia.org/wiki/Energy_in_Norway
	(General) Fish meal and fish oil prices, grain prices (e.g. soy & corn) now and in the future.
	OECD-FAO (2013), Agricultural Outlook 2013-2022: http://www.oecd.org/site/oecd-faoagriculturaloutlook/oecd-fao-expect-slower-global-agricultural-production-growth.htm
Environmental	**Environmental issues that affect the farming now and in the future, such as pollution and water quality now and in the future.**
	http://www.rijkswaterstaat.nl/en/waterways/water_quality/ http://www.rijkswaterstaat.nl/water/feiten_en_cijfers/vaarwegenoverzicht/noordzee/noordzee_schoon_veilig/index.aspx http://ec.europa.eu/environment/water/participation/map_mc/map.htm
Legal	**EU legal factors that affect how a company operates, its costs, and the demand for its products, now and in the future.**
	http://ec.europa.eu/small-business/most-of-market/rules/index_en.htm
	Domestic legal factors that affect how a fish farming company operates, its costs, and the demand for its products, now and in the future.
	© FAO 2005-2014. National Aquaculture Legislation Overview. Italy. National Aquaculture Legislation Overview (NALO) Fact Sheets. Text by D'Andrea, A. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 10 March 2005. [Cited 13 March 2014]. http://www.fao.org/fishery/legalframework/nalo_italy/en © FAO 2005-2014. National Aquaculture Legislation Overview. France. National Aquaculture Legislation Overview (NALO) Fact Sheets. Text by D'Andrea, A. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 1 February 2005. [Cited 13 March 2014]. http://www.fao.org/fishery/legalframework/nalo_france/en

	© FAO 2005-2014. National Aquaculture Legislation Overview. Spain. National Aquaculture Legislation Overview (NALO) Fact Sheets. Text by Olivert, A.A. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 16 May 2005. [Cited 13 March 2014]. http://www.fao.org/fishery/legalframework/nalo_spain/en © FAO 2011-2014. National Aquaculture Legislation Overview. Greece. National Aquaculture Legislation Overview (NALO) Fact Sheets. Text by Doffay, B. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 1 January 2011. [Cited 13 March 2014]. http://www.fao.org/fishery/legalframework/nalo_greece/en © FAO 2007-2014. National Aquaculture Legislation Overview. Norway. National Aquaculture Legislation Overview (NALO) Fact Sheets. Text by Skonhoft, A. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 14 December 2010. [Cited 13 March 2014]. http://www.fao.org/fishery/legalframework/nalo_norway/en
Political	**Aquaculture in politics in the EU affecting [this country] now or in the future.**
	http://ebcd.org/en/Fisheries_and_marine_issues/Newsletter/
	EU aquaculture sector policies/subsidies/tax policies/environmental laws now and in the future and how this affects [this country].
	http://ec.europa.eu/fisheries/cfp/aquaculture/index_en.htm http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l66015_en.htm
Technological	**Technological capability. Established techniques for hatchery production, growout husbandry, feeds and culture systems now and in the future.**
	Meagre: DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4 http://www.diversifyfish.eu Duncan, N., Estévez, A., Porta, J., Carazo, I., Norambuena, F., Aguilera, C., Gairin, I., Bucci, F., Valles, R., Mylonas, C.C., 2012. Reproductive development, GnRHa-induced spawning and egg quality of wild meagre (Argyrosomus regius) acclimatized to captivity. Fish Physiology and Biochemistry 38: 1273-1286. Toksen, E., Buchmann, K., Bresciani, J., 2007. Occurrence of Benedenia sciaenae van Beneden, 1856 (Monogenea: Capsalidae) in cultured meagre (Argyrosomus regius Asso, 1801) (Teleost: Sciaenidae) from western Turkey. Bull. Eur. Ass. Fish Pathol. 27(6): 250. Merella, P., Cherchi, S., Garippa, G., Fioravanti, M.L., Gustinelli, A., Salati, F., 2009. Outbreak of Sciaenacotyle panceri (Monogenean) on cage-reared meagre Argyrosomus regius (Osteichthyes) from the western Mediterranean Sea. Dis. Aquatic Organisms 86: 169-73. Ternengo, S., Agostini, S., Quilichini, Y., Euzet, L., Marchand, B., 2010. Intensive infestations of Sciaenocotyle pancerii (Monogenea, Microcotylidae) on Argyrosomus regius (Asso) under fish-farming conditions. Journal of Fish Diseases 33: 89–92. Koyuncu, C. E., Castro Romero, R., Karaytug, S., 2012. Lernanthropus indefinitus N. Sp (Copepoda,

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Greater amberjack:

DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4

http://www.diversifyfish.eu

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Wreck fish:

DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4

http://www.diversifyfish.eu

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Atlantic halibut:

DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4

http://www.diversifyfish.eu

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	using an aromatase inhibitor, Fadrozole, in Atlantic halibut (Hippoglossus hippoglossus). Aquaculture 324-325: 276-280.
	Grey mullet: DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4 http://www.diversifyfish.eu
	Pike perch: DIVERSIFY (2013), Enhancing the European aquaculture production by removing production bottlenecks of emerging species, producing new products and accessing new markets (DIVERSIFY), proposal, FP7-KBBE-2013.1.2.09, annex 4 http://www.diversifyfish.eu

5.2 Market

Economic	**Economic development of [this country] now and in the future. This includes economic growth, national income, interest rates (for investment), exchange rates (for imports and exports), inflation rate.**
	Economic growth: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, GDP and main components - Current prices (nama_gdp_c)
	National income: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, GDP and main components - Volumes (nama_gdp_k)
	Interest rates (for investment): http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, EMU convergence criterion series - annual data (irt_lt_mcby_a)
	Exchange rates (imports/exports): http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Euro/ECU exchange rates - annual data (ert_bil_eur_a)
	Inflation rate: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, HICP (2005 = 100) - annual data (average index and rate of change) (prc_hicp_aind)
	Domestic production (fisheries) [Production: tonnes product weight & euro]
	Meagre: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in the United Kingdom (fish_ld_uk), Argyrosomus regius UK, FR
	Greater amberjack: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in France (fish_ld_fr), Seriola dumerili FR, ES, IT
	Wreck fish: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in the United Kingdom (fish_ld_uk), Polyprion americanus UK, FR, ES
	Atlantic halibut: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in the United Kingdom (fish_ld_uk), Hippoglossus hippoglossus

	UK, FR, ES, DE
	Grey mullet: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in the United Kingdom (fish_ld_uk), Mugilidae / Mugil cephalus UK, FR, ES, IT, DE
	Pike perch: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Landings of fishery products in France (fish_ld_fr), Stizostedion lucioperca FR, DE
	Domestic production (aquaculture) **[Production: tonnes product weight]**
	FishStatJ - software for fishery statistical time series; Release: 2.1.0 See: http://www.fao.org/fishery/statistics/software/fishstatj/en
	Developments in retail (concentration) and foodservice (concentration).
	Wagenberg, Coen van, Lusine Aramyan, Nico Bondt, Frank Bunte, Erno Kuiper (Marketing and Consumer Behaviour Group, Wageningen University), Elsje Oosterkamp, Karl Shutes (2011), *Consumer Market Study on the Functioning of the Meat Market*; Results of the in-depth meat market analysis, 30 November 2011, LEI, part of Wageningen UR
Political	**Domestic government policy regarding fish consumption / health now and in the future (e.g. government campaigns to increase fish consumption).**
	UK: E. Weichselbaum, S. Coe, J. Buttriss and S. Stanner (2013), Fish in the diet: A review, British Nutrition Foundation, London, UK FR: Dooren, Corné van & Gerard Kramer (2012), Food patterns and dietary recommendations in Spain, France and Sweden ES: Dooren, Corné van & Gerard Kramer (2012), Food patterns and dietary recommendations in Spain, France and Sweden ES: Aranceta, J and Serra-Majem, L. (2001), Dietary guidelines for the Spanish population. Public Health Nutrition [online]. 4(6a) IT: Agriculture and Agri-Food Canada (2013), Inside Italy - The Fish and Seafood Trade, International Markets Bureau DE: Agriculture and Agri-Food Canada (2012), Inside Germany - Seafood Trade, International Markets Bureau
Environmental	**Sustainability: Consumer awareness concerning sustainability**
	CBI Trend Mapping: Frozen White Fish Products Source: CBI Market Information Database • URL: www.cbi.eu • Contact: marketintel@cbi.eu • www.cbi.eu/disclaimer CBI Trend Mapping: Frozen Tuna Products Source: CBI Market Information Database • URL: www.cbi.eu • Contact: marketintel@cbi.eu • www.cbi.eu/disclaimer
	Sustainability: Sustainability certification and eco labelling
	CBI Trend Mapping: Frozen White Fish Products Source: CBI Market Information Database • URL: www.cbi.eu • Contact: marketintel@cbi.eu • www.cbi.eu/disclaimer
Social	**Consumers preferences: Dietary trends**
	CBI Trend Mapping: Frozen White Fish Products Source: CBI Market Information Database • URL: www.cbi.eu • Contact:

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