

EN

OPPORTUNITIES FOR THE DEVELOPMENT OF COMMUNITY AQUACULTURE

CONSULTATION DOCUMENT

1. INTRODUCTION

Capture of wild fish has levelled off since the 80's, and most fisheries in the world are now near or above sustainable exploitation limits. In parallel, global consumption of fish as food has doubled in the period 1973-2003. In particular, the consumption of freshwater fish has grown massively in recent decades, primarily in East Asia. Large increases have also been observed in the consumption of crustaceans and bivalve molluscs. In most cases, the growth of consumption has been matched by an equally rapid growth in production from aquaculture, primarily but not exclusively within Asia. Various projections have been made to 2020 on fish supply and demand. On the whole, the projections confirm that per capita consumption of fish as food is expected to rise. According to FAO, most of this demand is expected to be met by aquaculture¹.

Some Member States have started a reflection on the need to boost aquaculture development². The strategic importance of aquaculture is also largely recognised in other countries around the world, such as the US³ or Norway⁴ who are actively working to promote the development of this sector.

The challenge for the Commission is to identify how it can promote at its level an environment favourable to the sustainable development of aquaculture. For the European aquaculture sector, the challenge is to reap maximum benefit from this global perspective for aquaculture growth, while continuing to develop in a sustainable way.

Aquaculture development should not be seen as a substitute for fishing activities, but as capture of fish from wild stocks is limited by maximum sustainable yields, the part of farmed fish and seafood in the global production can only increase. This can help develop complementarities and synergies between the two sectors.

2. AQUACULTURE: A CHANCE FOR EUROPE

2.1. The 2002 Community Strategy for aquaculture

Conscious of the strategic importance of aquaculture, the Commission presented in 2002 a Communication on a Strategy for the Sustainable Development of European Aquaculture⁵: the "2002 Strategy". The Communication was based on a ten-year vision of aquaculture aimed at achieving the status of a stable industry guaranteeing long-term

¹ [FAO: The state of world aquaculture 2006](#)

² The Irish authorities for example have recently adopted a plan aiming at doubling aquaculture production over 10 years.

³ See for example the US "[National Offshore Aquaculture Act](#)" of 2007

⁴ See for example "[Aquaculture 2020 – A foresight analysis](#)", The Research Council of Norway 2005.

⁵ [COM\(2002\)511 final](#)

secure employment and ensuring health and environmental protection.

To address these challenges, the strategy identifies a number of actions to be taken at different levels (Community, Member States, economic operators) to reach three objectives, namely: creating long term secure employment; providing products that are healthy, safe and of good quality while promoting high animal health and welfare standards; and ensuring an environmentally sound industry.

In essence, actions identified at EU level mainly consist of creating a support framework to encourage the sustainable development of aquaculture (through fisheries structural funds), stimulating research and innovation (through Community Research Programmes⁶), while establishing a regulatory context which ensures a high level of environmental consumer and animal protection.

At this stage, most of the actions listed in the 2002 Strategy falling under the EU responsibility have been launched: some are already finalised (in particular the adoption of the new European Fisheries Fund⁷), some are well underway (e.g.: "organic" or "aliens species" draft regulations) and some are ongoing actions (e.g. research). Considering the time lag between the date of EU decisions, their translation into concrete actions, and the delay in access to data collected, it is not yet possible to assess accurately their effect.

1. Do you consider it justified for the Community to develop a specific strategy for aquaculture and why?

2. Do you share the vision for a sustainable development of European aquaculture as set out in the 2002 Strategy? Would you consider that it needs to be adapted to evolving circumstances?

2.2. Going forward

The successive enlargements of the EU in 2004 and 2007 represent an increased opportunity for Aquaculture. European Aquaculture will now be considered and assessed not only for 15, but for 27 Member States⁸.

Aquaculture in Europe is not a uniform sector: There are various types of aquatic farming facing different situations, challenges and opportunities. Closed or open systems, extensive or intensive, on land, in lakes, in ponds fed by rivers or even groundwater, near the shore or offshore characterise a large diversity of freshwater finfish, marine finfish or shellfish farming with their individual characteristics. More details on the various branches of aquaculture are provided in a [background document](#).

Direct employment in aquaculture represents more than 65000 jobs⁹. The latest available data published by EUROSTAT in 2005 indicated that total EU-27 aquaculture production was 1, 38 million tonnes in 2004. This represented about 2.3 % of total world aquaculture (in 2004). However, this overall figure needs to be modulated to take

⁶ [FP5, FP6 and FP7](#)

⁷ [Council Regulation \(EC\) No 1198/2006](#)

⁸ As a consequence, and for the purpose of comparison of data and trends over time, any indication in this document to EU-27 refers to the information available for all present 27 EU Member States, even though some of these Member States were not part of the EU at the date referred to.

⁹ [2002-2003 data for EUR 25 – "Employment in the Fisheries Sector", European Commission, 2006](#)
page 6

account of variations according to the main sectors concerned. For shellfish, freshwater fish and marine fish productions, the EU contribution to world production in 2004 was respectively about 5.7%, 1,3% and 10,9%.

However, trends for the enlarged EU since the Strategy was published in 2002 show that overall EU aquaculture production has not been keeping pace with other parts of the world (see [background document](#)).

While worldwide production shows steady overall yearly growth rates close to 9 % between 1995 and 2004, EU-27 overall aquaculture production grew at only 3 to 4 % until 1999 and it can be considered that for the 2000 to 2004 period, total EU production has been stagnating.

Mollusc production already decreased between 1999 and 2002 (mainly oyster production) and freshwater fish began to decrease as from 2001. However, marine fish production continued to increase, in particular due to the regular rise in salmon production. Sea bass and sea bream farming showed spectacular annual growth rates initially, but ran into an economic crisis in Europe at the beginning of this decade. This is typical of a young and fast developing industry.

During this period the European marine fish aquaculture, as a whole, managed to overcome crises without registering too many losses. The year 2006 has been in general a good year for European finfish farmers¹⁰, even if in some sectors, total production has not yet regained the record output levels of 1999-2000.

The aquaculture industry operates within a competitive and market driven business environment, while depending on the availability of various production factors, such as primary resources (space, water, feed) and technological support. Aquaculture products have to be healthy and safe for the consumer, and aquaculture production has to be environmentally sustainable and has to ensure animal health and welfare. Establishing the framework and practicalities for the aquaculture business, including controlling standards set at EU level, remains primarily a matter for national or even regional public authorities; but because of the varied dimensions of the aquaculture industry, it may sometimes also fall under the purview of a number of administrations at different levels. Furthermore, European aquaculture is made up of various sectors which do not necessarily face the same challenges or to the same degree.

The considerations above are instrumental in identifying the most appropriate avenues for aquaculture development in Europe.

The following sections highlight some of the recently identified key challenges for aquaculture and some possible windows of opportunity for its development in the Community. The final two sections refer to the funding possibilities available at Community level to provide support for sustainability in the aquaculture sector and to promote European research and innovation. The Directorate General for Fisheries and Maritime Affairs of the European Commission wishes to receive the views of the relevant stakeholders on these issues and on possible ways forward for the sustainable growth of aquaculture.

When providing their views, stakeholders should bear in mind the three following

¹⁰ See the [website of the Federation of European Aquaculture Producers](#)

background considerations:

- 1. In line with the subsidiarity principle, there is a need to ensure that actions or initiatives are taken at the appropriate level (community, national or local).**
- 2. It is important to think carefully of the role of public authorities in encouraging sustainable aquaculture and improving governance.**
- 3. The different branches of the aquaculture sector may face different challenges and consideration must be given to their specificities and differences.**

3. ECONOMIC OUTLOOK FOR EU AQUACULTURE

EU aquaculture is an established industry that serves an ever increasing consumer demand for fish products that wild fisheries are increasingly unable to meet. Market forces are among the most important drivers shaping the development and trends in the European aquaculture sector. The EU is the world's biggest net importer of fisheries products and continues to increase its dependency on imports for its fish supply¹¹.

Globalisation and worldwide expansion of aquaculture might offer investment opportunities to the EU aquaculture industry abroad but it also puts it under increasing competitive pressure from aquaculture and fisheries products from outside the EU, both within European markets and beyond. This pressure can however vary depending on the sectors concerned. Some well established aquaculture products such as salmon, seabass and seabream have become mass produced products. Commercial success and profitability in respect of such sectors is largely dependent on lower production costs with regard to their sale price.

Consolidation of production can be seen as a response by firms to growing downward pressure on prices by creating economies of scale in productions which help reducing production costs. Consolidation is very visible in some areas and for some products (such as salmon). But some EU aquaculture sectors are still characterised by the existence of many medium or small sized firms.

Specialisation in niche markets, normally resulting in higher value products, is another possible answer to pressure on prices. Another possible form of specialisation is focusing on selling know-how, technology and services. It appears that the EU still has a clear competitive advantage in these areas.

Vertical integration seems also to be an increasingly important phenomenon where supermarket chains play a crucial role with a marked concentration of purchasing power over time. In this context, although competing with fishery products, aquaculture products can also be seen as complementary (to fishery products) by adding variety and more stability in production (compared to landings of fish). This could contribute to more attractive fish counters and to increase consumer loyalty to fish products. Similarly,

¹¹ [Facts and figures on the CFP: Basic data on the Common Fisheries Policy](#) - Edition 2006, European Commission

as far as the processing sector is concerned, aquaculture products can ensure stability of supply. However, supermarket chains and processors are often viewed as seeking to secure supplies as cheaply as possible, irrespective of geographical origin.

European consumer choice takes into account values such as health benefits or environmental protection considerations. Setting quality standards in aquaculture can create further market opportunities and add value to Community aquaculture products. Highlighting them on packaging for example is therefore a good way for producers to differentiate their products in the market. However, after having shown real enthusiasm in the early 2000s, it seems that part of the fish farming industry may now consider that the proliferation of labels may render them basically useless in marketing terms because they can create confusion for consumers. Moreover, the aquaculture industry is still facing some image problems with regard to the quality of its products and the interaction of aquaculture with the environment, related to outdated production practices used at the time the industry began to develop.

But in parallel it is also true that the big supermarket chains demand quality labels and traceability of products. Organic production, reduction of environmental impact or geographical labels are typical examples of actions already used by some producers or retailers (supermarket chains).

3. What effect is globalisation having on the EU aquaculture sector and what are the main factors affecting its competitiveness?

4. How do you see the future of the market for Community aquaculture (niche markets, mass production ...)?

5. How can the image problem of aquaculture be addressed to increase consumer acceptance of farmed products?

4. ENVIRONMENTALLY - FRIENDLY AQUACULTURE GROWTH

4.1. Environmental impact of aquaculture

The EU is committed to a high level of environmental protection and a number of provisions exist to ensure that the development of aquaculture is sustainable from an environmental point of view. For instance, the Water Framework Directive¹² and the future Marine Strategy Directive, under discussion in the European Parliament and the Council¹³ provide a framework for the definition and preservation of fresh and marine water in the EU. Another current example is the proposed Regulation on "alien species"¹⁴ which was an action item of the 2002 Strategy. This Regulation aims to ensure a level playing field in the EU regarding authorisations granted in Member States for the use of new non indigenous aquatic species in aquaculture.

Addressing the environmental risks of aquaculture such as eutrophication, risks created

¹² [Directive 2000/60/EC](#)

¹³ [COM\(2005\)505: Proposal for a Directive establishing a framework for Community Action in the field of Marine Environmental Policy \("Marine Strategy Directive"\)](#)

¹⁴ [COM\(2006\)154 final](#)

by escapees, alien species or transported and restocked fish is a considerable challenge. The aquaculture industry is very active in this context, as demonstrated for example by the setting-up of Guidelines or codes of good practice at European¹⁵, regional¹⁶ or local level¹⁷.

Numerous EU funded research projects have already provided experience and improved knowledge of how to reduce the environmental impacts of aquaculture on the basis of an ecosystem approach or by addressing more specific points¹⁸. This has given rise to the suggestion that aquaculture is too often focused on monoculture of aquatic species and that new and established methods of polyculture may hold answers as to at least some of the problems posed.

Member States may establish their own additional environmental protection rules, provided that EU wide rules are not undermined and Treaty provisions are respected. This can create additional obstacles or administrative burdens for the aquaculture industry.

Without questioning the need to meet the objectives of environmental protection, there may be scope to examine if the measures which are implemented at Member State level to reach these aims are best suited to providing sustainable aquaculture growth.

On organic discharge to waters for example, some national environmental legislation is claimed to lead to more and more difficulty in obtaining new licences for aquaculture farms, or simply renewing the licences of long existing farms.

Extensive aquaculture is also usually seen as an environmentally-friendly way of producing fish, especially with regard to its role in wetlands and biodiversity conservation. However, extensive finfish or shellfish aquaculture can be subject to intense predation from protected birds¹⁹ and there are often claims of insufficient management of such conflicts. This specific issue has also been the subject of Community research²⁰.

¹⁵ See for example the [code of conduct developed by the Federation of European Aquaculture Producers \(FEAP\)](#)

¹⁶ See for example "Guides for sustainable development of Mediterranean aquaculture – interactions between aquaculture and environment; BIOGES & IUCN workshop - Las Palmas 26-28 October 2006

¹⁷ See for example the "Association of Scottish shellfish growers Code of Good practice" - Oct 2005 or the "Code of Good practice for Scottish Finfish aquaculture"- Jan 2006.

¹⁸ See for example FP6 Research projects such as ECASA (ecosystem approach for sustainable aquaculture), SAMI (Synthesis of Aquaculture and Marine Ecosystems Interactions), GENIMPACT (genetic impact of aquaculture on native populations), IMPASSE (invasive aliens species in aquaculture), AQUAS (water quality and sustainable aquaculture)...

¹⁹ [Directive 79/409/EEC](#)

²⁰ See for example REDCAFE project (FP5) and INTERCAFE project (COST programme)

6. What are the most important environmental challenges faced by aquaculture and what are the appropriate avenues to address them?

7. Can you identify, within the framework of Community environmental legislation, business-friendly options to regulate aquaculture activities?

4.2. Dependency of Aquaculture on the Environment

Aquaculture production is also highly dependent on a high quality environment. This is not only valid for farming of fish species such as Salmonids which are very demanding in terms of water quality and oxygen, but is becoming an increasing concern for most aquaculture sectors. Because of possible changes in sea water conditions, shell fish farmers are already frequently faced with harmful algal blooms that cause not only severe economic damage (in case of suspension of production, but also a subsequent degraded perception by consumers).

Shellfish farming can also be excluded from the market in case of microbiological risks, sometimes due to insufficient management and control of environmental pollution in production areas. The Water Framework Directive (and the future Marine Strategy Directive, under discussion in the European Parliament and the Council) should be instrumental in ensuring water quality. Some producer organisations have established risk assessment procedures and contingency plans to deal with pollution risks that often develop in coastal areas after heavy rainfall and flooding of inland waters.

8. In a context of increasing scarcity of pure water, what are the main avenues to ensure that aquaculture producers continue to get access to water of the best possible quality for aquaculture development?

5. AN AQUACULTURE INDUSTRY PROVIDING HEALTHY FOOD WHILE ENSURING ANIMAL HEALTH AND WELFARE

Animal farming aims at providing healthy food to the consumer (top quality with no harmful substances), while ensuring optimal health for the farmed animals (disease and parasite control) which meets their welfare needs.

Good health and husbandry conditions well suited to the physiological needs of the farmed animals are prerequisites for optimal growth and production performance. Animal health and welfare is therefore intrinsically linked to business performance. Guaranteeing the welfare of farmed fish certainly also contributes to a better image for the aquaculture industry.

The legislative framework for diseases control in aquatic animals has just been subject to a full review²¹. Veterinary pharmaceutical legislation has also been reviewed²², in

²¹ [Directive 2006/88/EC](#)

²² [Directive 2001/82/EC as amended by Directive 2004/28/EC](#)

particular to increase the availability of veterinary medicines that can be used in the Member States.

Vaccine developments have proved to be real success stories in some aquaculture sectors (e.g. salmon), by significantly reducing fish mortalities while also reducing the need for chemical drugs. However other health problems (e.g. sea lice) continue to represent a real challenge for sustainable aquaculture.

Progress continues to be made and Community Research programmes play an important role in numerous areas, such as seafood quality and safety, welfare of aquaculture animals, or disease control²³.

9. What are the most important challenges related to animal health and welfare and how should they be addressed, in view of the different constraints faced by the aquaculture sector?

6. AQUATIC FARMING: A NEW ERA IN ANIMAL DOMESTICATION

Contrary to most of the present domestic farmed animals, and with the exception of some forms of extensive aquaculture (e.g. carp), the farming of aquatic animals is a very recent phenomenon in the relationship between mankind and animals. Domestication is not only a matter of keeping animals in captivity and providing them with food for growth, but it culminates in fully mastering reproduction, breeding and nutrition and results in a high selection of breeds depending on the production objective and the way in which animals are farmed. For instance, in order to have good quality fillets for the processing industry, fish of a convenient size and shape and a list of other prerequisites are requested. If these fish are to be farmed, reproduction should be easy to control, they should be easy to produce in hatcheries, fast growing in given climatic conditions and with a high feed/flesh conversion rate.

The recent boom in tuna fish farming in the Mediterranean, based on the on-growing of wild caught fish and fed with unprocessed wild caught fish is one example of a "new" aquaculture species where true domestication has not been achieved.

A considerable number of "new" aquaculture species have been developed in recent years. Many of them can be considered as having been rather easily developed by using rearing techniques close to those used for other aquaculture species like trout, salmon, seabass or seabream. However, such "new" species have usually been less efficient in terms of growth rate (and production costs). The range of potential candidate new species for aquaculture is so vast that it is certainly worth continuing with research to identify the most promising ones.

However, the main aquaculture species demanded by the European market are carnivorous species. This gives rise to a debate on the possible non-sustainability of industrial fisheries which provide the raw material to produce the fish meal and fish oil which is indispensable for feeding carnivorous fish. As such resources are limited; the

²³ See for example FP6 Research projects such as WEALTH(Welfare and health in sustainable aquaculture), AQUAFIRST (genetic and genomic approaches for stress and disease resistance), EUROCARP (disease and stress resistant carp), PATHMEDA (pathogens and parasites in Mediterranean aquaculture), PIMQUABI (pathogens and immune responses of molluscs)...

growth of aquaculture creates an increased demand and higher prices for fish meal and fish oil.

The aquaculture industry is trying to decrease its reliance on fish for fish feed. The vast majority of aquaculture production on a global scale (herbivorous species such as carp, catfish and tilapia) is carried out with the use of feeds with very little or no fishmeal. Significant progress has also been made in developing new forms of proteins or omega-3 fatty acids, and in reducing fishmeal and marine oils in the commercial diets of species such as salmonids and shrimp; however, there are limits to such reductions because of the basic physiological needs of carnivorous species.

Species diversification, improved knowledge on basic physiological functions and feed technology and improvement have been, and continue to be, the main subjects for research²⁴.

10. What do you see as the most promising avenues in fish or shellfish domestication to provide opportunities for aquaculture growth in the EU?

11. To what extent do you consider that fish oil and fish meal would represent a limiting factor to aquaculture growth in the European Community? Which option would you favour to reduce limitations from such feed?

7. OVERCOMING SPACE LIMITATIONS: THE IMPORTANCE OF TECHNOLOGICAL DEVELOPMENTS AND SPATIAL PLANNING

The European natural environment provides highly suitable conditions for growing a number of high value aquaculture species. However, the increasing competition for space represents a major challenge for further development of freshwater fish farming and aquaculture production sites in coastal areas. Public acceptance of aquaculture development in an area is usually inversely proportional to the population density and the tourist attractiveness of the area. Extensive aquaculture in inland ponds and wetlands or in coastal lagoons also faces increased competition with other economic developments (agriculture, industry, tourism...).

7.1. Technological innovation

In these circumstances, technological innovations in farming systems provide means for the aquaculture industry to maximise the value added per unit of space and/or water used, and to do so in a way which can reassure regulators and the general public that aquaculture activities are safe and well managed.

Closed recirculation systems have been developed for some years now (e.g. for eel, catfish, and turbot). But progress continues: as an example, the installation of a closed circuit water recirculation farm for seabass in the UK shows real promise. Denmark has become a leading country for closed water recirculation systems for trout farming. A number of freshwater recirculation units for new species have been built in the Netherlands. An indoor recirculation farm has been developed in Estonia to make fish

²⁴ See for example FP6 Research projects such as SPIINES 2 on Sea urchins, PERCATECH on Eurasian perch, LUCIOPERCIMROVE on pikeperch, AQUAMAX on sustainable aqua feeds...

independent of climatic conditions, thereby significantly shortening rearing times. These are interesting developments which may pave the way for further expansion in other locations.

Moving aquaculture offshore is also seen as a promising way to avoid the conflict for space in coastal areas and reduce the environmental impact. Two offshore aquaculture conferences have been held in Europe in the last three years²⁵. Considering the rough sea environment in which offshore aquaculture would have to operate, a grading system has been devised for sites according to exposure to weather and sea conditions. Most existing European marine fin fish sites are class one and class two and there are a few class three semi-exposed sites in operation in Ireland which use cages designed to withstand severe wind and wave conditions and ocean swell. As an example, according to the business press, the organic salmon farm located in exposed waters between Clare Island and the Irish mainland appears to be a success story²⁶, although more expensive to operate. Sites such as this are seen as technology incubators for developing class four or ocean locations (wave heights of 20m). In this context, synergies between offshore aquaculture and other offshore activities have to be found. For instance, the increase of offshore wind energy production, which is expected in the future, may be seen as an opportunity for expansion of offshore aquaculture production, based on sound research into offshore technologies and innovation.

Again, European research has been contributing to progress in all the issues illustrated above²⁷.

12. What technological innovation would you consider most promising to allow aquaculture development in a limited space context? What are the main obstacles to their development and how could they be overcome?

7.2. Spatial planning

Furthermore, as maritime activities continue to thrive, there will be increasing competition between them for the use of the space while the needs of the local population and the protection and conservation of the marine environment have to be respected and ensured.

Some Member States have already signalled their intention to update their inventory of potential sites for aquaculture; and other Member States are implementing Spatial Planning Systems for marine and maritime activities. Spatial planning has a key role to play in providing guidance and reliable data for the location of economic activity, giving certainty to investors, avoiding conflicts and finding synergies between activities and environments. The role and function of aquaculture should be identified in this context. In addition, these planning tools could facilitate anticipating risks from, for instance, climate change effects, floods or coastal erosion that may affect aquaculture sites.

The Commission believes that a system of spatial planning for maritime activities closely

²⁵ 'Farming the deep blue - Invest in the offshore revolution' in Ireland in October 2004, and the "Malta Offshore Aquaculture Conference" in October 2006.

²⁶ In "Fishupdate", February 2007, p37.

²⁷ See for example FP6 Research projects such as GRRAS (growth retardation problem in recirculation aquaculture systems), SUBFISHCAGE (development of a cost effective submersible cage system)...

related to on-shore planning mechanisms should be developed²⁸ and integrate aquaculture needs.

These general discussions are also being held in the context of the consultation process carried out for the future maritime policy for the EU which is trying to identify the relevant tools to create such a mechanism.

13. What are the main obstacles to access to marine or fresh water space for aquaculture activities? Would you consider that there is a need for public decision maker to set aside specific locations dedicated to the development of aquaculture?

14. How could marine/maritime spatial planning be developed to provide appropriate conditions for the sustainable growth of aquaculture sectors in coastal and offshore waters?

8. PROVIDING SUPPORT FOR SUSTAINABILITY

As announced in the 2002 Community Strategy for Aquaculture, amendments to the Fisheries Structural Funds Regulation to benefit aquaculture products and producers were adopted in 2004²⁹. In 2006, the new Regulation on the European Fisheries Fund (EFF) was adopted³⁰. It is the new Community framework to contribute to the sustainable growth of aquaculture in Europe for the 2007 to 2013 period.

Besides the possibilities available under measures of common interest or measures for sustainable development of fisheries areas, the EFF, under its Axis 2, gives particular attention to the promotion of sustainable aquaculture in Europe.

In view of the strategic importance of aquaculture and given the need for a high level of environmental and consumer protection while ensuring animal health and welfare, support targeting aquaculture production may be granted for:

- measures for productive investments in aquaculture, such as diversification towards new species, implementation of aquaculture methods reducing the negative impact on the environment, traditional aquaculture activities, protection against wild predators, etc;
- aqua-environmental measures : i.e. compensation for specific environmental constraints, participation in eco-management schemes, organic aquaculture, etc;
- public health measures (e.g. compensation to mollusc farmers in case of closures caused by biotoxins) or animal health measures (such as control and eradication of aquatic animal diseases).

At this stage, most Member States are still in the preparatory phase for the implementation and the use of EFF possibilities, and the establishment of their National Strategic Plan and subsequent Operational Programme in full partnership with all

²⁸ [Green paper : "Towards a future Maritime Policy for the Union: A European vision for the oceans and seas"](#)

²⁹ [Council Regulation \(EC\) No 1421/2004 amending Regulation \(EC\) No 2792/1999 laying down the detailed rules and arrangements regarding Community structural assistance in the fisheries sector](#)

³⁰ [Council Regulation \(EC\) No 1198/2006](#)

stakeholders. It is therefore too early for the Commission to have an overview of Member State strategies and measures regarding their aquaculture industry.

15. How can we ensure that EFF implementation will contribute to sustainable aquaculture growth in the EU?

16. Are there already some lessons to be drawn from the preparation of your National Strategic Plan and Operational Programme regarding aquaculture?

9. RESEARCH: A POWERFUL DEVELOPMENT TOOL

Aquaculture demonstrates a high potential for innovation and technological development. However, the sustainable development of European aquaculture requires a significant effort in research as an essential step to supporting the sector to enable it to integrate into coastal zones and its competitiveness in a global open market.

Significant European support has been made available, and continues to be made available through the 6th and 7th Research Framework Programmes (FP6 and FP7).

The 6th Research Framework Programme (2002-2006) was a powerful tool to support aquaculture research in key scientific areas such as health, welfare, breeding and genetics, environment, production systems and feeds. Support to small and medium-sized enterprises (SMEs) has also been very successful (with for some of the calls, 10% of the budget of this programme allocated to aquaculture projects). The aquaculture scientific community has also been involved in several FP6 large Integrated Projects and Networks of Excellence in the field of environment (Integrated coastal zone management), marine genomics, nutrition or disease. International cooperation with third countries has also been promoted through the INCO programme (set a link to a more detailed description: e.g. the slide show of seminar on FP6). In total, more than 70 RTD projects have been funded for a total EC contribution of 80 M€ during the last 4 years under the various specific programmes of FP6.

The 7th Research Framework Programme (link) will make possible continued support to scientific research in aquaculture. The minimum budget allocated to research in support of fisheries and aquaculture in Theme 2 (Food, agriculture and fisheries, and biotechnology) of FP7 is €33 million for the first two years. Another characteristic of FP 7 is the recognition of marine research as a cross-thematic priority. Subsequently it will offer the possibility to address cross-cutting research issues related to aquaculture (like for instance, climate change and new materials for offshore structures).

The aquaculture sector, as a self-sustaining activity with increasing business concentration in some sectors, is playing an important role in the development of new technologies due to its high potential for innovation. Publicly supported research should therefore concentrate on priorities of public interest or priorities with the highest investments risks, such as new technologies to make better use of resources and space while reducing negative environmental impacts, diversification of systems and species where knowledge is still scarce, animal disease prevention and improvements of farmed breeds, environmental effects on aquaculture and consumer protection (e.g. harmful algal blooms). In addition, efforts should be made to transfer the results to end users and to ensure that innovation is well received (societal impact).

European research in aquaculture is among the most successful in the world. It has contributed to innovation and to aquaculture growth in Europe, but it has also probably made a much greater contribution to the development of this industry in other parts of the earth. Innovation can also be seen as an opportunity for the European aquaculture equipment sector to export its know-how to other parts of the world.

A recent initiative has been taken by industry leaders for the establishment of a European aquaculture technology platform enabling it to maintain its world leadership, and to provide a strategic vision for the European aquaculture sector with respect to research and technological development. Other forward-looking initiatives are being undertaken to contribute to identifying key driving forces, challenges and research needs in the medium and long term³¹.

17. How can research policy be set in a strategic context to enhance its benefits, specifically for European aquaculture and/or European technology and know-how?

18. How can the transfer of research results be optimised so as to maximise the benefit to European business?

19. Which cross-cutting areas in marine research would you consider most important for aquaculture?

³¹ See for example the FEUFAR project (Future of European Fisheries and Aquaculture Research) financed under FP6