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**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND
THE EUROPEAN PARLIAMENT**

**A STRATEGY FOR THE SUSTAINABLE DEVELOPMENT OF EUROPEAN
AQUACULTURE**

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1. INTRODUCTION

Aquaculture is highly diverse and consists of a broad spectrum of species, systems and practices¹. Its economic dimension creates new economic niches, i.e. employment, a more effective use of local resources, and opportunities for productive investment. The contribution of aquaculture to trade, both local and international, is also increasing.

The Commission recognised the importance of aquaculture in the frame of the reform of the Common Fisheries Policy and the necessity to develop a strategy for the sustainable development of this sector². This strategy will be coherent with the other Community's strategies and in particular with the European Strategy for Sustainable Development³ and the conclusions of the Göteborg European Council of 15/16 June 2001.

The principal aquaculture products of the Union are fish (trout, salmon, sea bass, sea bream), and molluscs (mussels, oysters and clams). Production rose from 642,000 tonnes in 1980 to 944,000 tonnes in 1990, and reached 1,315,000 tonnes in 2000. This is just 3% of world aquaculture production, but EU is the world leader for some species like trout, seabass, seabream, turbot, and mussels. The value is currently € 2,500 million per year. Aquaculture constitutes 17% of the volume and 27% of the value of the total fishery production of the Union.

Europe has skilled aquaculture scientists and good research facilities, which have contributed significantly to the growth of the sector. The farming technology of some species was invented in Europe. However, in the last decade the annual growth rate of EU aquaculture of 3,4 per cent has been slower than the world average (11 per cent). The progress of fish farming has been good but is now tending to slow down, while shellfish culture advancement was rather modest with an average 2,1 percent per year.

Aquaculture in the Union is essentially made up by three major sub-sectors, which have different history and characteristics. These are:

1. *Freshwater fish farming.* This is a traditional activity that has now to face the problem of the relatively low market value of its products in relation to production costs. Trout is the principal cultured species in value of the Union, worth approximately 500 million €/year. Trout farming in the past had viability problems almost everywhere in the Union, in recent times the situation has slightly improved. The carp branch is experiencing a more difficult situation. There is a very large number of other species that can be reared but they run up against the problem of very limited demand. There is unlikely to be a major growth in the demand for fresh water fish in the near future, unless marketing

¹ "Aquaculture" means the rearing or culture of aquatic organisms using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment; the organisms remain the property of a natural or legal person throughout the rearing or culture stage, up to and including harvesting. (Council Regulation 2792/99 of 17 December 1999 laying down the detailed rules and arrangements regarding Community structural assistance in the fisheries sector, OJ L 337 of 30/12/1999)

² COM(2002) 181 final

³ COM(2001) 264 final

initiatives are taken to change the current trend. In most cases freshwater fish are farmed in intensive systems, so environmental constraints are important.

2. *Marine mollusc farming.* Molluscs account for more than 60% of the volume of the Union aquaculture but only 30% in value. This sub-sector is widely spread throughout the Union coastal area and can be locally extremely important in economic terms and for job creation. It is a relatively old traditional activity, often practiced in small and technically simple family-owned facilities. In general the existing technical development is adequate, although there is potential to develop the technology to farm a larger range of species. This is a no feed input activity as farmed molluscs feed on natural resources, and may suffer difficulties linked to the fluctuations of supply, as shellfish yield depends on climatic conditions. Profitability is also affected by increasingly frequent toxic algal bloom, or by specific local ecological problems.
3. *Marine fish farming.* is the most recent development, which started in the 1970s, and technically is the most complex. Until the beginning of the 1990s, marine fish farming was more profitable than any other aquaculture sub-sector and this attracted new investors with the consequence of rapid increases in production, causing market difficulties and price reductions. This sub-sector also suffers from environmental problems linked to intensive fish farming, where fish is fed with industrial feed. Production is dominated by salmon, both in terms of quantity and value. In the last fifteen years seabass and seabream farming in the Mediterranean has grown rapidly.

Marginal quantities of crustaceans and seaweed are also farmed in the Union. The latter may have potential for future expansion.

Aquaculture development is spread widely over the Union and often in rural zones or peripheral areas depending on fisheries, where alternative employment opportunities are chronically lacking. Little information is available on the socio-economic impact of coastal aquaculture activities in Europe. However a recent study carried out in some Scottish areas⁴ shows that salmon farming development stopped the decline of the rural population (for the first time in the last century), and that young people found employment throughout the year, while other economic activities like tourism were only seasonal. Aquaculture, and in particular mollusc and cage culture, can be a part-time additional revenue for fishermen or an alternative for workers displaced from the fisheries sector, as marine aquaculture needs employees skilled in working in and from a boat.

In 1998 aquaculture in the EU employed at least 80,000 full or part-time workers, equivalent to 57,000 full-time jobs. Traditional aquaculture plays an important socio-economic role in some areas. In Galicia (Spain), the European core of mussel and turbot farming, the number of jobs in aquaculture is approximately 13,500, without taking account of indirect employment. In France, oyster farming employs approximately 4,700 people in Charente Maritime and more than 3,000 in Brittany. In the 1980s and 1990s the development of marine fish farming produced thousands of jobs in peripheral areas of Scotland, Ireland and Greece.

⁴ The Scottish Office. "The Economic Impact of Scottish Salmon Farming". March 1999.

Not all the territory of the Union is appropriate for aquaculture development, as many different factors affect output and viability of aquaculture operations (e.g. water quality, availability and cost of space, climatic conditions etc.). It is critical, in considering the location of aquaculture sites, to proceed to a systematic, integrated assessment of both the positive and negative impacts of new aquaculture developments. This is essential before projects are financed with public funds.

A vision for the future

Aquaculture in the EU developed well in the last two decades, and this was partly allowed by the many Community initiatives that have been taken to support this sector. The Union has a vast legal armoury on aquaculture, and activities to enhance the legal framework are progressing. However, there is still room for further improvement, and the recent slowdown of growth must be addressed.

While the overall framework shows a positive potential for further development, aquaculture in the Union has still to cope with some problems, in particular in the context of health protection requirements, environmental impact, and market instability.

In the next ten years aquaculture must reach the status of a stable industry which guarantees long term secure employment and development in rural and coastal areas, providing alternatives to the fishing industry, both in terms of products and employment.

To secure employment and well-being, European aquaculture must be an economically viable and self-sufficient industry. The market has to be the driving force of aquaculture development; production and demand are finely balanced and any increase in production in excess of the likely evolution in demand should not be encouraged. The range of products must be enlarged, better marketing strategies have to be implemented. Private investors are, and have to remain, the leading force to put progress in practice, while a key role of the public powers will be to guarantee that the economic viability be parallel to the respect of the environment and the good quality of the products.

The fundamental issue is therefore the maintenance of competitiveness, productivity and durability of the aquaculture sector. Further development of the industry must take an approach where farming technologies, socio-economics, natural resources use and governance are all integrated so that sustainability can be achieved.

2. THE CHALLENGES

- Aquaculture still shows the typical market price instability of young agro-food industries enjoying rapid growth
- Although public perception believes that aquaculture products are contaminated with harmful chemicals, this is rarely the case. Seafood⁵ consumption is in fact beneficial for human health, if it is guaranteed that seafood farmed in and imported into Europe is safe, of good quality and produced in a manner providing for good animal health and welfare practices.
- In some regions, aquaculture faces a considerable problem with the public because of negative environmental effects.

Encouraging economic viability

The evolution of seafood market demand in Europe creates a good potential for farmed products, as they comply with the requirements of the supermarkets (regularity of supply, availability and homogeneity of products); new processing techniques have been developed and a wide range of new products based on aquaculture species has appeared.

However, responsibility for investment and production development belongs to the entrepreneurs, which must bear in mind that market saturation is one of the most serious dangers for the aquaculture industry. Most of the branches of the aquaculture sector have been exposed to falling market prices since the early 1990s. This was not necessarily bad, as it stimulated productivity and generated innovative approaches to marketing. But additional improvements in production efficiency are at present difficult to achieve and the low profit margins in all the main aquaculture branches leave few resources for producers to invest in research, development, and marketing.

Public aid. Financial assistance provided by the Community to investment in aquaculture from the late 1970's has stimulated production growth. Aids were legitimated by the fact that aquaculture was an instrument in regional cohesion policy; and marine aquaculture was high-risk investment in the 1970's and 1980's. Grants were successful in encouraging European investors, acting as catalysts for investment and starters for new sectoral developments that would have taken considerably more time to be achieved in their absence. Grants mainly benefited the newly born aquaculture branches. But nowadays the situation has changed and overproduction is a concrete threat for some branches.

New species, organic and "environment friendly" aquaculture. will help to expand EU aquaculture production. Enlarging the range of farmed species and strains will create new opportunities, and should continue to be actively promoted. The organic logo is an important indicator of reliable organic quality; some Member States have their own national rules, but there are no internationally binding organic aquaculture regulations. Also, forms of special "environment friendly" aquaculture (as for instance the extensive

⁵ "Seafood" for the purpose of this communication is taken to include all fisheries and aquaculture products

fish culture, see section 4.8.) deserve additional support, including the development of specific labels.

Aquaculture feeds. Fishmeal and fish oils are essential constituents of fish feeds. In 2000, no more than 35% of world fishmeal production went into fish feed. In the last decade the amount of fishmeal used to produce feed for fish farming has considerably increased, but the annual world fishmeal production has remained static. This because as aquaculture has grown it has diverted a growing portion of the fishmeal supply from its traditional use as feed for land animals. The use of fishmeal in animal feeds is determined by economics; when fishmeal prices increase, feed formulators use other protein sources from plants (soy, corn, wheat) to replace them in land animal feeds. The elimination of fishmeal from aquaculture feeds would not have a net effect on global fishmeal production in the short term, as fishmeal price would fall and higher levels would be used in poultry and swine feeds.

However the intensification of freshwater fish aquaculture in Asia may absorb by the end of this decade as much as 70-80 percent of world fish oil production and at least 50 percent of fishmeal production, creating problems of supply. This resource being limited, it is extremely important to continue the research effort to find substitute protein sources in the fish feed formulation.

Competition for space. Many complaints against aquaculture development reflect competition for space; the recent growth of aquaculture, particularly on the coastline where there is already a high concentration of activities, put it in the place of the newcomer disrupting the long-established *statu quo* between existing users. Land and water for aquaculture will be more and more expensive in future. Aquaculture establishments may be forced to move offshore, but this is a possibility for some species only. Here offshore technology needs to further develop.

The Commission's Demonstration Programme on integrated coastal zone management has shown that the best response to such complex situations is an integrated territorial approach that addresses concurrently the many different problems an area faces and involves all the stakeholders.

Markets and marketing. Generic promotional campaigns are important tools to open new markets and expand existing ones but public support through the FIG⁶ has proven to be insufficient, as costs are still too high for the “poor” aquaculture branches and it is almost impossible to finance trans-national campaigns. Reliable statistics on fish consumption are often lacking, and economic analysis is still needed, including on macro-tendencies. Real time statistical information on production and markets is also essential. Farmers are not using enough the available official quality schemes. In addition, the reluctance of some European farmers to adhere to common organisations reflects the highly individual nature of the profession, but the lack of a cohesive approach has already caused serious disruption in regional markets for some species.

Governance. A coherent and specific EU legislation for aquaculture does not exist, since many aquaculture issues are regulated by national legislation, which is influenced by a

⁶ Financial Instrument for Fisheries Guidance, Regulation (EC) 2792/99, OJ L 337 of 30/12/1999

number of horizontal Community Directives. This complex situation has been alleged to lead to competition distortions among producers from different Member States.

Guaranteeing food safety, animal health and welfare

Seafood is an important source of polyunsaturated fatty acids, proteins, phosphorous, iron, selenium, iodine and vitamins. Consumers must be able to profit from these qualities while being assured that aquaculture products are hygienic and safe.

Dioxin. The Council has adopted on 27 November 2001 Council Directive 2001/102/EC amending Directive 1999/29/EC on the undesirable substances and products in animal nutrition⁷, introducing maximum limits for dioxins in fishmeal, fish oil and feeds for fish. On 29 November 2001 the Council adopted Council Regulation (EC) 2375/2001 amending Commission Regulation (EC) 466/2001 setting maximum levels for certain contaminants in foodstuffs⁸, introducing maximum levels for dioxins in fish. The maximum level for fish will exclude the most contaminated 5 % of fisheries products from the market. It is unlikely to have an impact on farmed fish, since feed for fish has to comply with a strict maximum level resulting in the production of farmed fish respecting the maximum level for dioxins set for fish.

Antibiotics. The use of antibiotics in European aquaculture has decreased markedly in the past decade, mostly due to the development of vaccines. This trend should be further encouraged, and the development of new vaccines is a research priority. This also to further reduce the prophylactic use of antibiotics. Antibiotic residues in food are monitored according to the provisions of Council Directive 96/23⁹. Third countries exporting to the EU are also required to have residue-monitoring plans in place in order to meet the EU requirements.

Harmful algal blooms. regularly threaten public health and cause economic damage to fisheries, aquaculture, and tourism. Their causes are not yet completely understood, but there is increasing awareness about the key role of nutrients.

Animal health. The first Community legislation concerning animal health in aquaculture production was adopted in 1991. Today, detailed and harmonised legislation is in place covering animal health aspects of the aquaculture production. The primary legislation includes conditions governing the placing on the market of aquaculture animals and products¹⁰, measures for the control of certain fish diseases¹¹ and of certain diseases affecting bivalve molluscs¹². However, the legislation is specific to the situation of the sector in the late 1980s and early 1990s, so it needs to be updated and adapted to the present conditions of production and market.

⁷ OJ L 6 of 10/1/2002

⁸ OJ L 321 of 6/12/2001

⁹ OJ L 125 of 23/5/1996

¹⁰ Council Directive 91/67/EEC (OJ L 46 of 19/2/1991) as last amended by Directive 98/45/EC (OJ L 189 of 3/7/1998)

¹¹ Council Directive 93/53/EC (OJ L 175 of 19/7/1993) as last amended by Commission Decision 2001/288/EC (OJ L 99 of 10/4/2001)

¹² Council Directive 95/70/EC (OJ L 332 of 30/12/1995) as last amended by Commission Decision 2001/293/EC (OJ L 100 of 11/4/2001)

Sea lice. A peculiar veterinary problem linked with salmon farming is due to sea lice. These parasites proliferate on farmed salmon, and the young wild fish of migratory species (mainly of sea trout) could be heavily infected during their estuarine movements. The reduction of wild salmonids abundance is also linked to other factors but there is more and more scientific evidence establishing a direct link between the number of lice-infested wild fish and the presence of cages in the same estuary.

Disease control. in aquaculture should focus first on prevention (good management practices, vaccines, etc.) rather than cure, but the use of veterinary medicines is necessary in certain circumstances. As any veterinary medicinal product can only be granted a marketing authorisation after a full evaluation of its quality, efficacy, and safety¹³, the significant investment needed to develop new veterinary medicinal products limit the availability of such products for certain animal species or diseases¹⁴.

Addressing environmental effects

It is important that every aquaculture development produces a product that is not only acceptable to consumers in terms of price, quality and safety, but also in terms of environmental cost. Aquaculture is accused of producing negative environmental effects, although many of these effects still need to be scientifically substantiated. Actions should be taken to prevent environment degradation. The EU is a contracting party to the UN Convention on Biological Diversity¹⁵ and adheres to the FAO Code of Conduct for Responsible Fisheries¹⁶, it is evident that the Community's strategy for aquaculture development must be coherent with the strategies for environmental protection¹⁷.

Eutrophication. The effect of nitrogen and phosphorous releases from farmed animal faeces or uneaten food from individual farms is generally of little importance compared to the regional inflow of nutrients in open water masses, but it can be significant in the farm area and its immediate surroundings. The impact on biodiversity depends on the number and the extent of the sites and their location. In areas with numerous farms, nutrient enrichment and the risk of eutrophication are significant issues.

On-growing of wild fish. The demand of juveniles of wild origin generated by the development of eel and bluefin tuna farming has the potential to harm the status of these already highly exploited stocks.

Escapees, alien species and GMOs. Escaped fish inter-breeding with native populations may induce long-term damage by the loss of genetic diversity. The introduction of foreign species may lead to biodiversity threats if the released or escaped exotics take root in their new environment. The potential deliberate release of transgenic fish without

¹³ On the basis of Directive 2001/82/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to veterinary medicinal products (OJ L 311 of 28/11/2001, p. 1)

¹⁴ Commission Communication of 5 December 2000, COM(2000) 806 final

¹⁵ The United Nations Convention on Biological Diversity adopted 5 June 1992, it came into force 29 December 1993

¹⁶ Food and Agriculture Organization of the United Nations, 1995

¹⁷ In particular the European Strategy for Sustainable Development (COM(2001)264 final), the Biodiversity Action Plan for Fisheries (COM(2001) 162 final, Vol. IV), and the Commission Communication on the sixth environment action programme of the European Community (COM (2001) 31 final)

containment measures raises public concern in terms of risk to the environment. Introduction of new species may also lead to the introduction of diseases, both to farmed and wild stocks.

Positive effects of extensive farming. Sustainable aquaculture can help to improve environmental protection and restoration in many ways. Extensive systems are a very good way of exploiting the natural resources of the water bodies, so developing extensive farming is a way to associate an economic activity and the conservation/development of wetlands. Unfortunately their dependence on natural processes represents also a limit to their productivity, implying a low compatibility with intense economic activity.

Re-stocking. Many freshwater fish stocks would have been significantly reduced or would have disappeared from their natural habitat as a result of human activities without regular re-stocking with hatchery-produced fish. In some cases “ecological” re-stocking of species, which have died out in an area, as in the case of sturgeon, has been initiated.

Predation by protected species. Aquaculture facilities may suffer from predation by some protected wild species of birds and mammals. Predation may significantly reduce the profitability of an aquaculture enterprise and predator control is difficult, especially in large extensive ponds or lagoons. The efficacy of scaring devices is doubtful, because animals quickly become used to them. In the case of cormorants, probably the only protection for fisheries and aquaculture activities consists in the management of the still-growing wild populations.

Stimulating research

Since companies tend to get bigger, there is a trend for company led research. However, the cost of R&D activities is a major issue, as the current financial difficulties of many aquaculture branches preclude private enterprises from investing sufficient resources in R&D. There is also a need for more research on pharmaceutical products. However pharmaceutical companies are not always interested since the market is small and the size of the industry is limited.

3. OBJECTIVES

- Creating long term secure employment, in particular in fisheries dependent areas.
- Assuring the availability to consumers of products that are healthy, safe and of good quality, as well as promoting high animal health and welfare standards.
- Ensuring an environmentally sound industry.

The Community strategy for sustainable development of European aquaculture aims to create the best possible conditions that will enable aquaculture producers to offer a healthy product in the quantities required by the market, while not degrading the environment. The success of the strategy depends on collaboration by all the actors of the sector: national and local public administrations, mostly, but also the industry and the representatives of the other stakeholders, such as consumers. The rest of the

document defines the needed actions and the appropriate level at which to implement them.

Creating long term secure employment, in particular in fisheries dependent areas

The first, ambitious objective is to **increase employment in aquaculture by between 8,000 and 10,000 full-time job equivalents** over the period 2003-2008. This will be mainly obtained in fisheries-dependent areas by developing mollusc and cage farming, and will be an opportunity for workers who lose their jobs in the catching sector. The success of this objective will depend on four sub-objectives:

- a) **Increasing the Union's aquaculture production growth rate to 4 % per year.** Particular attention should be given to growth in the mollusc sub-sector, the farming of new species, "organic" production and environmentally certified production.
- b) **Solving the conflicts for space** that are currently hindering the development of aquaculture in some areas.
- c) **Promoting market development.** The enlargement of the market outlets, opening new markets, integrating production and sales, stimulating demand by quality and promotion policies, and the real time collection and analysis of production and market data are all needed here.
- d) **Improving the governance** in the aquaculture sector.

Assuring the availability to consumers of products that are healthy, safe and of good quality, as well as promoting high animal health and welfare standards

Consumers must continue to benefit from the positive health effects derived from consumption of fish and shellfish. It is essential **to offer the maximum level of consumer protection in terms of product safety and quality**, and to reduce the incidence of farmed animal diseases and prevent transmission of diseases to and from the wild stocks. Other issues to address under this heading are the welfare of farmed fish, and the risks associated with harmful algal blooms.

Ensuring an environmentally sound industry

It is important **to reduce the negative environmental impacts of aquaculture** by developing a set of norms and/or voluntary agreements which prevent environment degradation. Conversely, the positive contribution of certain aquaculture developments to the environment must be recognised and encouraged, including by public financial incentives.

Finally, the general objective of **enlarging the knowledge base of the industry** encompasses all the aspects of farming and is paramount for aquaculture as it is for every modern economic activity. It is essential to further encourage research and technological development, expanding the opportunities for its public financing and promoting private initiative in this area.

4. ACTIONS PROPOSED

4.1. Increasing production

- Re-focus priorities for public aid through the FIGG
- Promote research on new species and strains, as well as on alternative protein sources for fish feed
- Create specific common definitions and norms for organic and “environment friendly” aquaculture

Public aid. Regulation 2792/99 clearly states that increases in production that are likely to disrupt the market should not be encouraged. Therefore the Commission proposes that the intervention by public authorities in favour of aquaculture be re-directed towards favouring modernisation of the existing farms and diversification, rather than increasing production capacity for species where the market is close to saturation. Action should be taken on measures such as training, monitoring, research and development and clean farming technologies. The improvement of traditional aquaculture activities such as mollusc farming, that are important in maintaining the social and environmental tissue of specific areas, should be encouraged.

New species. The Commission believes that research on species diversification is a top priority, for both fish and molluscs. Selected new species must necessarily respond to customers’ preferences, in accordance with new market trends. Efforts should possibly be oriented to species such as seaweed, molluscs and herbivorous fish, that are able to utilise the primary production more efficiently. Another priority is the introduction of effective genetic improvement programmes using selective breeding, as this will lead to considerable gains in productivity. Introduction of new species should be carried out in such a way to avoid the introduction of diseases.

Organic and “environment friendly” aquaculture. Council Regulation (EEC) 2092/91¹⁸ sets up a framework of Community rules on production, labelling and inspection for organic farming. In the interests of producers and purchasers, the Commission wants to include norms for organic aquaculture in the Regulation. Some forms of aquaculture that are particularly beneficial for environment protection and restoration may be issued special assistance, including for the development of labels (see section 4.8.).

Aquaculture feeds. The Commission considers that research to find alternative protein sources for fish feed should be given top priority, in order to allow a further development of carnivorous fish farming and, at the same time, ensure the sustainability of industrial fisheries.

Feed used for aquaculture must not present a risk to human health, animal health or the environment. Therefore EC legislation will continue to be based on lists of substances that can or cannot be used in animal feeding. The conditions of manufacturing of feedingstuffs must guarantee the safety of the final product. The Commission will soon

¹⁸ On organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs, OJ L 198 of 22/07/1991

present a proposal on feed hygiene that will also cover the aquaculture feeding. Furthermore, all the additives included in feed are authorised and monitored by EEC legislation. This list is regularly assessed and updated, in the light of new scientific findings.

4.2. Competition for space

- Develop closed water recirculating systems, offshore fish cage technology, mollusc offshore rafts and long-lines
- Incorporate future aquaculture developments in Integrated Zone Strategies and Management Plans

Inland farming. The Commission considers that closed water recirculating systems should be further developed in order to reduce water demand and to transfer farms to areas with less landscape value. They have already proven to work for a limited number of species but for many others they are not yet cost-effective on a commercial scale. Further research and refinement of technology may make recirculating systems more economically viable.

Marine fish farming. Fish cages should be moved further from the coast, and more research and development of offshore cage technology must be promoted to this end. Experience from outside the aquaculture sector, e.g. with oil platforms, may well feed into the aquaculture equipment sector, allowing for savings in the development costs of technologies.

Mollusc farming. In traditional mollusc farming areas competition for space is not a major issue but finding space for new concessions is hard because this kind of farming is highly sensitive to external pollution and requires large amounts of space to thrive. Technological development of offshore rafts and long-lines has been successful. Therefore the Commission believes Member States should give greater priority to FIG financing of this technology that will help to expand the sub-sector, even if it is more burdensome in terms of initial capital investment and running costs.

Integrated Coastal Zone Management (ICZM). The perspective of moving aquaculture further away from the coast should not prevent it from being considered as user of the coastal territory with the same rights as other human activities. Future aquaculture development should be based on Integrated Zone Strategies and Management Plans, which consider aquaculture in relation to all other existing and potential activities and take account of their combined impact on the environment.

The Commission has submitted to the Council and the European Parliament a European Strategy for ICZM¹⁹, following which the European Parliament and the Council adopted an EU Recommendation on ICZM²⁰. The Strategy should lead to improved management of coastal zones. The Recommendation identifies aquaculture among the sectors and areas to be addressed in the future National ICZM strategies. The approach outlined in the Strategy and the Recommendation could serve as a model for introducing sustainable

¹⁹ COM (2000) 547 final

²⁰ Recommendation 2002/413/EC of 30/5/2002, OJ L 148/24 of 6/6/2002

development in other parts of the European territory (e.g. river catchments are the most appropriate management unit in inland waters).

4.3. Market development, marketing and information

- Increase the use of official quality marks
- Improve the image of the industry, and develop promotional campaigns
- Develop new tools to gather statistical information on production and markets
- Further develop farmers' partnerships

Quality. Consumer confidence in products is to a large extent dependent on both perceived product quality and information about the product. In this respect, appropriate and well-designed labelling is an important tool. European aquaculture producers should take advantage of the possibilities offered by the EU schemes for product marketing and use the official quality marks available²¹. The Community has created logos enabling food products that benefit from these quality protection schemes to be readily identified. Their wider use should be encouraged, even though the FIFG finances the costs of quality certification, until now only three aquaculture products have been issued with a label.

Promotion. As the image of farmed fish may be very different from country to country, a major communication effort has to be made. Consequently, the conditions for FIFG support for generic promotional campaigns should be revised to make funds available in a special budget for trans-national campaigns.

Market data. Mechanisms should be put in place to monitor the market and inform the stakeholders about its development in real time (e.g. from auctions or ex-farm data). The Commission therefore encourages Member States to offer FIFG support to develop more sophisticated and effective information and communication tools for the transfer of commercial information, to allow a more rapid implementation of promotional measures, the organisation of market strategies, and application of suitable structural changes. However these systems must not reduce competition or encourage agreements between producers to fix prices.

Farmers' partnership. The most important marketing measure that farmers should take is to further develop co-operatives, trade organisations, and producer's organisations/associations. These are essential tools to prevent upheavals in supply as well as to compensate for the lack of economy of scale of small farms.

²¹ Council Regulation (EEC) No 2081/92, OJ L 208 of 24/07/1992 and Council Regulation (EEC) No 2082/92, OJ L 208 of 24/07/1992

4.4. Training

- Adapt training programmes to aquaculture needs
- Recognise the role of women
- Recognise aquaculture in rural development and reversing the decline in coastal communities

Training. A special effort has to be made to improve training. Training of farmers is essential in particular on environmental problems, as many of those problems could be eliminated by improvements in farm management and operational practices. Educational programmes to sensitise producers to sustainability issues should be implemented. The Commission encourages Member States to consider the aquaculture sector's needs when determining their European Social Fund programmes.

The role of women. It is appropriate to improve the quality and the number of work opportunities for women, which are often based on seasonal employment or activities requiring low level of training and commanding low wages. Women's support in the running (including processing, marketing and retailing) of aquaculture enterprises should be better recognised. Training for women involved or wishing to become involved in accounting or management activities should be provided in ESF programmes.

Rural and coastal development; reversing the decline in coastal communities. When programming rural and coastal development measures, Member States should recognise the role played by aquaculture in the local economy, for the maintenance of the social and cultural heritage of these areas, and for maintaining the population above critical levels. Its leverage role for the development of tourism should also be acknowledged.

Member States should also consider the promotion of aquaculture as a means to generate employment opportunities for the redeployment of fisheries workers. Existing Community aid regimes may be adapted to this extent in the context of the mid-term review 2003-2004. The Commission will promote the development of aquaculture in its strategy to counter the social, economic and regional consequences of fisheries restructuring.

4.5. Governance

- Stakeholder participation must be further developed
- The industry should make more use of self-regulation and voluntary agreements

Stakeholder participation. Policies aiming simply at boosting production without maintaining a critical perspective on the strategy adopted may seriously affect both the physical and the economic environment. The inclusion of broader consultations will need changes in the decision-making process. Therefore, the Commission considers that the respective roles of governments and private sector must be redefined, and stakeholder (producer associations, researchers, consumers, and special interest groups) participation and consultation in policy planning must be further developed.

Codes of Conduct and Codes of Practice. The lack of specific EU legislation for aquaculture has been alleged to lead to distortions of competition; self-regulation could provide answers to some of the difficulties encountered by both the aqua-farmers and the legislative institutions. The Commission invites the farmers associations to develop and update trans-national Codes of Conduct²² and more specific Codes of Practices derived from them. This may reassure consumers that certain negative attributes possibly associated with the products, for instance in terms of environment and safety, do not apply to those purchased from producers or retailers who adhere to the Codes. Voluntary Codes may also reduce competition distortions between producers, improve the image of the aquaculture products and enlarge market demand.

EMAS. A special case of voluntary agreement not yet used by the aquaculture sector is the Eco-Management and Audit Scheme. The EMAS Regulation²³ extends the scope of EMAS to all sectors of economic activity and introduces a specific logo. Registration in the scheme requires an organisation to adopt an environmental policy containing commitments both to achieve continuous improvements in environmental performance and to comply with all relevant environmental legislation. Participation in EMAS will enable an organisation to gain a marketplace advantage and save costs. The Commission recommends to the aquaculture industry to join the EMAS scheme.

More specific “environment friendly aquaculture” labels may be also envisaged. The Commission will study if special provisions have to be developed at European level, or if such labels should better be developed by the industry itself on the basis of Codes of Best Practices.

4.6. Safety of aquaculture products

- Recast of the Community legislation on food hygiene
- Provisions for dioxin and antibiotic residues
- More research on and control of toxic algal blooms and aquatic animal diseases
- Regular updating and simplifying of aquatic animal health legislation
- Modification of the veterinary pharmaceutical legislation

4.6.1. Public health issues

EU legislation on hygiene of foodstuffs. A recast of Community legislation on hygiene of foodstuffs was adopted by the Commission in July 2000 and forwarded to the Council and the European Parliament²⁴. The recast of legislation is primarily motivated by the need to ensure a high level of health protection for the consumer. The implementation of hazard analysis and control principles (HACCP) and the observance of hygiene rules

²² Based on the FAO Code of Conduct for Responsible Fisheries (1995), that basically addresses the governments

²³ Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS). OJ L 114 of 24/04/2001

²⁴ COM(2000) 438final, OJ C 365 of 19/12/2000

must ensure this safety. In addition, provision is made for the hygiene rules to be applied at all levels of the food chain, from primary production to delivery to the final consumer. Farmers will be required to keep records relevant to health protection (feed origin, animal health status, use of medicines etc).

Dioxin. Council Directive 2001/102/EC and Council Regulation (EC) 2375/2001 foresee that the maximum levels of dioxins in feed and food will be reviewed for the first time by 31 December 2004 at the latest in the light of new data on the presence of dioxins and dioxin-like PCBs, in particular with a view to the inclusion of dioxin-like PCBs in the levels to be set. A further review by 31 December 2006 at the latest will aim to significantly reducing the maximum levels.

Antibiotics. The food scare caused by the detection of residues of banned antibiotics in imported farmed shrimp has resulted in a number of safeguard measures. Surveillance on the use of antibiotics in aquaculture and for antibiotics and other residues will be reinforced in the light of these findings.

Harmful algal blooms. The risk of toxic blooms must be assessed as a standard part of a feasibility study for the establishment of an aquaculture operation. For shellfish culture in areas at risk, continuous monitoring of the environment and the cultured animals has to be assured (legislation is already in place). Toxic algal blooms are one of the most serious limiting factors for the future of shellfish farming in Europe, and unfortunately there are no practical means of substantially reducing the impact of a toxic bloom or of accurately predicting their occurrence. More research has to be carried out on this topic.

4.6.2. *Animal health issues*

Veterinary legislation. There is a continuous need for the Commission to regularly review, update and simplify the animal health Community legislation for aquatic animals and products with regard to ever changing developments, particularly in the diversity of aquaculture production and in international practical experience and scientific knowledge.

At farmers' level, it is important to encourage partnership between farmers and to develop good management practices, including preventive measures aiming to avoid introduction of new pathogens and the spread of diseases to farmed and wild stock. Ways to introduce new species without endangering the current stocks should be sought.

Sea-lice. Extensive research is being carried out to find solutions to this problem and this work should continue. Management measures are also encouraged: monitoring, fallowing, co-ordinated treatment in adjacent farms. Management measures for the control of sea lice should also be included in the envisaged recast of the EU legislation on fish disease, in particular the need for exclusion zones should be examined.

Veterinary medicines. In order to address the specific needs of aquaculture, the Commission has proposed some modifications of existing pharmaceutical legislation²⁵.

²⁵

COM(2001) 404 final of 26 November 2001

4.7. Animal welfare

- Initiatives to improve farmed fish welfare

The welfare status of captive livestock is an important determinant of society's overall acceptance of farming technology. The Standing Committee of the European Convention for the Protection of Animals kept for Farming Purposes (Council of Europe) is currently elaborating a recommendation on farmed fish, and the European Commission services are participating in this work. When the recommendation is approved and if it is necessary for its uniform application, the Commission will consider making a proposal to the Council for specific legislation on the protection of farmed fish as provided by Directive 98/58/EC²⁶ on the protection of farm animals. This could improve the public perception of intensive aquaculture.

4.8. Environmental aspects

- Mitigate the impact of wastes
- Manage the demand for wild fish for on-growing
- Develop instruments to tackle the impact of escapees, alien species and GMOs
- Integrated pollution prevention and control
- Specific criteria and guidelines for aquaculture Environmental Impact Assessments
- Recognise and strengthen the positive impact of extensive culture and re-stocking
- Find solutions for the predation from protected wild species

Eutrophication. Council Directive 91/676/EEC²⁷ aims to reduce water pollution caused or induced by nitrates from agricultural sources, including the spreading or discharge of livestock effluents. The Commission will study if the Directive should be extended to include intensive fish farming.

Ways of mitigating the impact of nutrient wastes that deserve consideration by Member States and private enterprises include: integrating aquaculture into coastal and river basin area management, placing production facilities in areas with good water exchange, using improved feed and feeding methods, and fallowing (site rotation of cages in order to speed recovery of the bottom layer). Effluent treatment equipment is available at present for land-based systems and farmers may ask for FIFG aid to install it, while new waste collection systems under cages may be developed, and they will be eligible for FIFG funding. The Commission invites the competent authorities of Member States to facilitate the delivery of public authorisations needed to deploy this equipment. Farmers must also be given a sufficient number of sites to rotate in order to practice fallowing.

²⁶ Council Directive 98/58/EC, OJ L 221 of 08/08/1998

²⁷ Of 12 December 1991, concerning the protection of waters against pollution caused by nitrates from agricultural sources. OJ L 375 of 31/12/1991

On-growing of wild fish. The on-growing of eel and bluefin tuna currently depends on the capture of wild fish, because the controlled reproduction in captivity of these species has not yet been achieved. Tuna farming has increasing effects on tuna fisheries in the Mediterranean and may affect the livelihood of fishermen, because of the capture of juvenile fish. The Commission will take this into account in relevant fishery management initiatives.

Escapees, alien species and GMOs. The Commission has financed research on the threats to the diversity of wild Atlantic salmon caused by farm escapees, but further studies are needed. The process started in February 2000 by NASCO and the North Atlantic salmon farming industry to develop guidelines to minimise salmon escapees is particularly worthy of support. The Commission will examine whether such guidelines should be implemented by way of compulsory rules and may extend them to other fish species and strains.

The Commission considers that all Member States should adhere to the ICES Code of Practice on the Introduction and Transfer of Marine Organisms²⁸ to prevent accidental introductions. The Commission will propose management rules on the introduction of non-indigenous aquatic species that are consistent with the provisions of this Code.

The Commission has funded some research projects on the potential risks of transgenic fish in containment facilities, which ensures that Europe has the expertise available to address the safety issues. However, the Commission is also examining the need for specific legislation on transgenic fish.

As the introduction of new species for farming, in particular when they are not indigenous, may also lead to the introduction of diseases, good and careful management practices including preventative measures at farmers' level are essential, in addition to possible legislative implications.

Integrated Pollution Prevention and Control (IPPC). Activities covered by Council Directive 96/61/EC²⁹ need an "integrated, periodically reviewed" permit, addressing pollution to air, water and soil, waste prevention and disposal, energy use, accident prevention and site clean-up. Permit conditions must be based on best available techniques (BAT). The Commission organises an exchange of information on BAT, resulting in publicly available BAT reference documents (BREFs). The IPPC Directive mainly covers industrial activities with a high pollution potential but also intensive livestock farming (pigs and poultry). The Commission will examine the inclusion of intensive fish farming into the scope of the IPPC Directive and the development of an appropriate BREF.

Environmental Impact Assessment (EIA). Thorough EIA procedures governing the location of farming operations should always be applied for intensive fish farms and should be adapted to the type and the scale of the proposed development and to the perceived sensitivity of the receiving water body. The Commission will examine the

²⁸ International Council for the Exploration of the Sea. 1995

²⁹ Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, OJ L 257 of 10/10/1996

feasibility of developing specific criteria and guidelines to undertake EIAs for aquaculture.

Extensive fish culture. Due to its poor economic performance, the development of ecologically beneficial aquaculture depends on public support. The Commission invites Member States to recognise the positive role of extensive fish farming, also in consideration of its potential for tourism, recreation and education to nature.

Certain environmental aspects of ponds or other water bodies in use for aquaculture are eligible for EU support in connection with agriculture and landscape conservation, in the framework of rural development schemes³⁰. The midterm evaluation of the rural development plans will provide a first insight into the effectiveness of this financial assistance. Encouraging extensive farming is also possible, under certain conditions, via the FIG, and it could be extended. Farmers should also consider the use of labels of origin, because the quality of extensively produced fish differs from intensively produced animals of the same species. Extensively produced fish may have a commercial advantage.

Re-stocking. Stocked fish should originate from local broodstock, to avoid the risk of negative genetic interactions with wild populations. Member States should consider the development of fish farms specifically set up to support the stocking of inland waters.

Predation by protected species. The Commission considers that the relevant public authorities should investigate methods to protect fish farms from wild predators. Under Article 9 of Council Directive 79/409/EEC³¹ Member States can take measures to limit the impact of protected bird species in order to prevent serious damage to fisheries and water and for the protection of flora and fauna.

4.9. Research

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| <ul style="list-style-type: none">• Extending the opportunities of financing research and technological development• Identifying research priorities |
|---|

Research in the enterprises. Aquaculture is a self-sustainable industrial activity and is therefore expected to cater for its own R&D needs. However, the current financial position of many aquaculture branches does not permit private enterprises to face the cost of R&D activities. Therefore they need to be aided by national research programmes and general Community incentives such as SME research funding. It is envisaged that in the future the FIG could also provide additional support for small scale applied research conducted by aquaculture enterprises.

Co-ordination. Only specialised research institutes have the technical skills to carry out most of the required research. The Commission considers that researchers should co-ordinate their activities with their national authorities and the industry.

³⁰ Council Regulation (EC) No 1257/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations, OJ L 160 of 26/06/1999

³¹ Directive 79/409/CEE of 2 April 1979 on the conservation of wild birds, OJ L 103 of 25/04/1979

The 6th Framework Programme. There also exist clear EU-wide research needs in support of aquaculture within the CFP. Aquaculture environmental impacts and other interactions, as well as fish and shellfish health aspects, are important policy issues, which will need to be addressed by research funds in support of Community policy development within the 6th Framework Programme (2002-2006)³². In addition, relevant consumer health and product quality aspects will be considered by horizontal EU research programmes in the food quality and safety domain.

Research priorities. Some of the most important research needs in relation to aquaculture are identified in section 5.4. of the Biodiversity Action Plan for Fisheries. The development of the 6th Framework Programme will provide additional opportunities to strengthen the research priorities in support of the Action Plan. Other important R&D needs have been highlighted in the previous sections of this Communication.

5. CONCLUSIONS

The Commission strategy for a sustainable development of the European aquaculture industry aims at:

- Creating long term secure employment, in particular in fishing-dependent areas;
- Assuring the availability to consumers of products that are healthy, safe and of good quality, as well as promoting high animal health and welfare standards;
- Ensuring an environmentally sound industry.

The success of aquaculture in creating employment will depend on the ability of the industry to be economically viable and self-sufficient. This involves aspects related to production development, market, training, and governance.

Production development is possible at a quicker pace than in the recent past but aquaculture has to remain a market-led activity. A variety of “structural” actions is needed: enlarging the number of farmed species, not encouraging the construction of new production capacities for branches that are already close to market saturation, developing tools to check and inform stakeholders about production and markets, improving marketing, communication efforts, promotional campaigns and generic advertising, improving the partnership between producers and promote good management practice. These actions should include preventive measures aiming to avoid introduction of new pathogens and the spread of diseases to farmed and wild stocks. The FIFG regulation will be adapted in order to take in consideration these new challenges and objectives.

Quality aspects are also important: the Union has provided for the key legislative instruments and incentives, so now it is up to the producers and their associations to take

³² Decision No 2002/1513/EC of the European Parliament and of the Council of 27 June 2002 concerning the Sixth Framework Programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002-2006)

the initiative. The emerging sector of organic production will contribute to expanding the industry; it is necessary, however, to establish a common definition of “organic aquaculture production” with specific norms and criteria.

A critical limiting factor for production development is the availability of space and clean water. Developing certain technologies such as water re-circulating systems, offshore cages and long-lines will allow for a reduction of dependence on local resources. Nevertheless, this cannot solve all the problems; Integrated Coastal Zone Management will be needed for a proper integration of aquaculture with the other activities carried out on the coast.

Training is needed in order to maintain the entry of well-qualified technical and managerial staff into the sector in the future, especially women.

Stakeholders’ participation in the process of policy planning for aquaculture at local, national and international level needs to be improved. Member States are invited to consider this issue. The Commission encourages the industry to self-regulate and to adhere to the EMAS scheme.

To ensure the availability of healthy products for the consumer, the Commission is working on the key issue of product safety, through the current revision of the existing legislation, the new provisions on dioxin control and the reinforced surveillance for antibiotic residues. The Commission is also working on a recasting of a number of key Directives on public and animal health issues, and on updating the legislation on veterinary medicines. In addition, a regular updating and adaptation of the animal health legislation to developments in the industry, practical experience and scientific knowledge gained, is carried out.

International action to improve the welfare of farmed fish is progressing, and the Commission is contributing to it. The Commission will consider proposing legislation in due course.

In order to promote an environmentally sound industry, the Commission will consider the development of specific criteria and guidelines for aquaculture Environmental Impact Assessments. It may also consider extending the field of application of the “nitrates” Directive (91/676/EC) to include intensive fish farming. The inclusion of intensive fish farming within the scope of the IPPC Directive 96/61/EC would also lead to improved environmental performance across the board and will help to reassure the European consumer about the environmental sustainability of the industry.

To minimise other potential environmental risks, the Commission will consider the development of rules on containment of farmed fish, the implementation of management rules on the introduction of non-indigenous aquatic species, as well as the need for specific legislation on transgenic fish.

The Commission invites the relevant national authorities to recognise and support the potential beneficial effects of extensive aquaculture on the environment. This will also require to take measures to protect it against predation from wild species.

Finally, research in aquaculture should be strengthened. EU-wide aquaculture research and development needs with a clear relation to CFP issues should be addressed by EU

research funding schemes. Research related to industrial development will mainly be addressed by the industry itself, helped by national programmes and by general Community incentives such as SME research funding, although it is envisaged that in the future these needs will also be supported by national FIG programmes.

ANNEX

TIMETABLE		
ACTION	LEVEL OF INITIATIVE	YEAR*
Creating employment, in particular in fishing dependent areas		
Increase the focus of structural financial aid on horizontal measures and concentrate assistance to individual firms on modernisation and “clean” technologies Increase the range of products and the stability of supply Develop information tools on production and market Improve public support to trans-national marketing campaigns Strengthen the support to POs and producers associations	European → modification of the FIFG regulation	2004
	National → modification of the FIFG programmes	
Harmonisation of the rules on organic aquaculture	European → include specific provisions in EU regulation 2092/91	2003 or 2004
Solve the problems of space	European → Recommendation on Integrated Coastal Zone Management	2002
	National → implementation of ICZM strategies and give priority to appropriate technologies	
	Private (with European and national financial support using the existing R&D schemes) → technological development	
Quality labelling, improvement of aquaculture’s image	National and private → increase the use of existing opportunities	
Increase integration of small-scale farms and develop POs	Private → increase the use of existing opportunities	
Increase the level of training, including for women, in particular on sustainability issues	National → consider aquaculture training needs when defining the European Social Fund programmes	
Improve governance in the sector	National → increase stakeholders participation in aquaculture policy planning	
	Private → develop Codes of Conduct/Codes of Practice and adhere to the EMAS	

Assuring the availability to consumers of products that are healthy, safe and of good quality, as well as promoting high animal health and welfare standards		
Guarantee product safety	European → revision of existing legislation and reinforced surveillance on antibiotic residues	2002 or 2003
Ensuring veterinary protection	European → regular updating and adaptation of the animal health legislation to developments in the industry, practical experience and scientific knowledge gained Modification of the legislation on veterinary medicines	Regular 2003
	Private → good management practice, including hygiene standards and health preventive measures ensuring the safe and appropriate use of antibiotics	
Protect farmed fish welfare	European → possible EU Directive when necessary for uniform application of Council of Europe Recommendation after its adoption	If necessary
Ensuring an environmentally sound industry		
Forecast, monitor and reduce the environmental impact of aquaculture	European → examine the possibility for specific criteria and guidelines for Environmental Impact Assessment of aquaculture. Consider extending the field of application of Directives 91/676 and 96/61 to include intensive fish farming.	2003
	National → encourage the use of mitigation measures and facilitate licensing of sites (for cage fallowing) and building permits (for sedimentation ponds)	
	Private → adopt mitigation measures	
Minimise escapee problem	European → examine the possibility for rules on containment	2004
Reduce the risks associated with non-indigenous species	European → propose rules on introductions	2003
Transgenic fish	European → examine the need for specific legislation	2003
Recognise and strengthen the positive impact of extensive culture	European → modification of the FIFG regulation	2004
	National → support extensive farming	
	Private → labels	

Research		
Identify research priorities that will contribute to sustainable development of EU aquaculture industry	European → identified by this Communication	
Improve the financing of and participation in research programmes	European → 6 th Framework Programme	2002
	Modification of the FIG regulation	2004
	National → increase co-ordination of programmes	
	Private → increase co-ordination with and between research institutes	

* Expected year of fulfilment of the action.