Report to the European Commission
DG Fisheries

Study of the market for aquaculture produced seabass and seabream species

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Executive summary

Introduction

1. The aim of this study is to provide a detailed analysis of the production and marketing of seabass and seabream in Europe, to assess the causes and impacts of the 2001-2002 price crisis, to evaluate the potential market demand for these species over the next 5 years and to suggest marketing strategies to enhance demand.

2. The University of Stirling led the study, begun in September 2003, and was responsible for administration and compilation of the main report. Partner organisations were given responsibility for reporting on the situation in one or more countries with which they were familiar.

Production of seabass and seabream

3. The first efforts to breed seabass and seabream were made in the late 1970s and early 1980s in France and Italy. Production increased rapidly during the 1990s and by 2003 had reached nearly 200,000t.

4. Seabass and seabream are produced in most countries bordering the Mediterranean Sea. The main producers are Greece, Turkey, Spain, Italy and France, which in 2002 accounted for 90% of production. Smaller producers are Portugal, Croatia, Cyprus, Israel, Malta, Egypt, Tunisia and Morocco.

5. Production of both species increased from 108,000 t worth €655 million at first sale in 1998 to 181,000t worth €764 million at first sale in 2002, and is expected to have reached nearly 200,000t in 2003. However, like other aquaculture sectors, as production expanded unit values declined. Average first sale prices per kg over the period fell from €6.32/kg to €4.39/kg for seabass and from €5.79/kg to €4.07/kg for seabream. The relative proportion by volume and value of seabass to seabream has remained much the same at 45% to 55% respectively throughout the time period.

6. Greece is the most significant producer, accounting for 57% of all production in 2002. The sheltered and extensive coastline offers many suitable sites for cage farming, and ideal environmental conditions. There have been major discrepancies in Greece between officially reported and actual production; actual production is estimated to have been around 60% higher in 2002 than the official figure.

7. Production of seabass and seabream from capture fisheries remains relatively static at between 16,000 and 20,000t per annum. Seabass is the more important species with production in the region of 11-12,000t p.a.. Prices for wild seabass have apparently not been affected by the fall in prices for farmed fish.

8. The bulk of aquaculture production to date has been in the size range of 300g to 500g, but as the industry has matured and prices have fallen, producers have increasingly looked to differentiate their products through ongrowing to larger sizes which to date have also fetched higher prices. However, the cost of producing larger fish is significantly higher than for smaller fish, and it is likely that as production of larger sizes increases, market prices will come down, thus reducing the attraction of this option.
9. Seasonality of production varies from country to country, depending on growing conditions and market demand. There is a tendency to stock fry in the spring and to harvest in the autumn of the following year before the winter. This results in large volumes of fish coming onto markets at a time of year when demand is naturally falling, thus exacerbating the decline in prices. Some producers now grow a greater proportion of fish to larger sizes and target different markets. In addition, some hold stocks over the winter despite the extra costs and risks in order to satisfy large multiple clients who demand continuity of supply.

10. Fry are produced on an increasingly large scale in hatcheries, and availability is no longer a constraint on the industry. Fry costs have fallen by around 50% since 1990, but still represent 15-20% of the cost of production. Greece is the main producer of fry, and also the main importer. Turkey is self sufficient, with

a small export of seabass. France and Italy are significant exporters. Spain imports bass and exports bream.

11. Production in 2002 was spread across more than 1000 hatchery and ongrowing sites, operated by more than 700 companies, and employing over 7000 people. 80% of production in Greece was from companies producing more than 500t p.a., with 4 companies producing more than 5,000t each. In Spain and France also, most production was from companies of over 500t. In Italy, Turkey and Portugal, however, production was mostly from farms producing less than 500t p.a.. Around 85% of production is from cages, and 15% from land based systems. Productivity amongst the main producers was estimated to be 18.45 tonnes per full time employee.

12. Average production costs (350-400g fish) typically vary between €3.68/kg in Turkey and €5.24/kg in Portugal. However, large vertically integrated companies in Greece producing their own fry have production costs of as low as €3.50/kg. Feed, fry and labour account for around 70% of production costs. Maximum cost efficiencies, for the main part, have already been effected and any further gains are likely to be marginal and realised only slowly.

13. In all countries, licensing procedures are difficult and time-consuming, in some cases taking up to 5 years. Aquaculture is a relatively new industry and commonly lacks specific legislation. There is often conflict and competition with other users eg fisheries and tourism. In Greece especially, it is an acknowledged fact that most existing sites are exceeding their licensed capacity, and this matter clearly needs resolution to enable more effective policy decisions. The uncertainty over the scale of discrepancy in Greek production necessarily created problems in the estimations contained in this report, which we have attempted to minimise through triangulation and cross-referencing wherever possible.

14. The use of EU structural funds (presently FIFG) has played a major role in the rapid development of the bass and bream sector over the past 20 years, especially the funding of new production capacity. In autumn 2002, in response to the price crisis, the EC invited member states to suspend all financing of projects which might entail a risk of creating surplus production capacity for seabass and seabream. Future support is likely to focus more on market development initiatives, such as improved quality and channel infrastructure, new product development, promotion, and measures to reduce production cost.

15. The main factors affecting the future development of the industry are site availability, cost of production, economic stability, and market demand. Greece and Turkey in particular have good site availability and growing conditions, low costs of production and it is likely that most future production will come from these countries.

16. Production in the short term however is forecast to fall to around 185,000t in 2005, before increasing again to nearly 220,000t in 2008. The anticipated fall in production is attributable mainly to industry rationalisation, especially in Greece, due to falling prices and financial losses. An optimistic forecast, considered less likely, anticipates production remaining level in 2003 and 2004, before rising to around 283,000t in 2008. This assumes the best possible conditions for development of the industry to be effective during the interim period, including strong government support for development of new capacity and major investment in market development initiatives.

The market for seabass and seabream

17. The main market for seabass is Italy (42,500t in 2002, 46% overall share). Spain and Turkey are next in importance at 13% and 11% of the market respectively. Turkey however is self-sufficient and is a net exporter of bass, whilst Spain as with Italy depends on imports. The main markets for seabream are Spain (26,500t in 2002, 25% share) and Italy (24,000t in 2002, 22% share), with Greece (16%) and Turkey (11%) next in importance. The over riding pattern of international trade is the majority of exports coming from Greece and supplying the largest markets in Italy and the Iberian Peninsula.

18. Amongst the main producer/consumer countries, per capita consumption of seabass ranges from 0.1kg in France to 0.7kg in Italy. For seabream the range is from 0.06kg in France to 1.6kg in Greece. Trends in consumption over the period 1998-2002 indicate no growth in Greece and Turkey, slow growth in Italy, modest growth in France, and very rapid growth in Spain and Portugal. Consumption in northern European and Scandinavian countries is low and although demand is growing slowly, these markets are unlikely to account for more than 5% market share in terms of volume by 2008. However, there is perhaps greater scope for expansion in terms of higher unit value products.

19. The markets for bass and bream may be broadly segmented in two principal areas: foodservice (or catering) and the retail sector. Multiple retailer chains increasingly dominate the retail market in all countries studied, with the market share of traditional fishmongers diminished and decreasing. The catering markets are of particular importance in Spain and Italy, and are increasingly met by relatively cheap Greek imports.

20. A particular feature of all markets studied is the expressed preference of consumers for locally grown products over imports; a common factor seems to be the favourable image of local products enhanced through quality assurance schemes. Imports are commonly unbranded and quality is reported to be highly variable owing to long transit times and post-harvest handling.

21. Within all the markets it was evident that the supermarket chains are either already, or are fast becoming, the dominant force. The concentration of retail power within a comparatively small number of chains results in the need for producers to be able to negotiate and trade with organizations much larger than their own, and there are now signs of producer cooperation and consolidation in this respect.

22. Seabass and seabream are still almost universally sold as whole fish. However, as one moves away from regions bordering the Mediterranean, there is an increasing demand and willingness to pay for value added product forms, including quality assured and branded whole fish. Filleted and gutted products are starting to make an appearance, but are still relatively insignificant in relation to the size of the overall market.

23. Seabass and seabream have inherent disadvantages for product development compared with other cultured species such as salmon and trout. Most notable are the high costs of production and the typically small harvest size. This is likely to mean that new product forms are, initially at least, based on more limited whole fish transformations, rather than filleted products which have to compete with other well established round and flat fish products which can be produced at significantly lower cost.

24. Deficiencies within the marketing chain were widely reported and were most evident from those points of the market furthest from the production centres. Ironically those markets where quality problems seem worst are typically expected to pay the highest prices to cover the transport costs incurred. Internationally traded product frequently has to pass through transport hubs with a negative impact on transit time and product quality. There is considerable scope and need to improve the logistical aspects of the industry.

25. Promotional efforts in the industry to date have been limited or non-existent. A 4 year programme of generic promotion funded by the EU and the Greek government has been agreed and is expected to start in 2004. It should be emphasised however that promotion should only be undertaken if there is confidence of being able to deliver the product expectations created.

26. Two forecasts of demand have been made, baseline and optimistic. Both forecasts assume demand remains relatively flat over the period to 2005, whilst industry rationalisation occurs, prices stabilise, and market development plans are made. From 2005 the baseline forecast anticipates that demand could rise to around 255,000t by 2008, assuming that there is only a limited impact from market development initiatives, and production costs remain the same, The optimistic forecast suggests that demand could increase to 322,000t by 2008, assuming that industry rationalisation has largely been completed, and that market development efforts are much more stringently and successfully pursued.

The 2001-2002 price crisis

27. After a period of relatively stable pricing during the late 1990s and 2000, over the period January 2001 to March 2002, prices for bass and bream (300-450g, Greek fish in Italy) fell from €5.75 and €5/kg to around €3.75 and €2.75/kg respectively, and this fall was reflected for other fish in other countries.

28. The fundamental cause of the price crisis was an imbalance between supply and demand caused by rapidly rising production especially in Greece without proper planning, market support or promotion. The situation was exacerbated by the intrinsic seasonality of bass and bream production, which naturally tends to result in the largest volumes being harvested in the autumn when demand is falling. Over production appears to have been a major factor, especially of bream in Greece and Spain.

29. The impact of the crisis was to reduce profitability and in many cases cause losses. Many smaller farmers were either taken over or subsequently went out of business, and larger companies have assumed greater

prominence in the selling of fish. However, for the most part the industry is still dominated by small and medium producers and there is still much further scope for rationalisation.

The use of FIFG funds for the further development of the bass and bream industry

30. With regard to recent price trends in the industry, it appears that whilst prices improved slightly in 2003, they were still on average below the cost of production for sea bream produced in Greece and Spain, sectors which together account for nearly 40% of all bass and bream production in all countries. In addition, in the short term it appears that sufficient production capacity already exists to meet existing demand; this situation should prevail given that supply is forecast to fall. Any measure to increase production capacity in the short term, in the absence of appropriate measures to stimulate demand, runs the risk of again creating surplus capacity and putting further downward pressure on prices.

31. In the short term, therefore, FIFG funds should be mainly focussed on market development initiatives, such as improved quality and channel infrastructure, new product development and promotion, and measures to reduce production cost. In addition, the evolution of the market should be continually monitored, and more effective planning and control of the development of the industry should be implemented.

Conclusions

32. Production grew rapidly over the period 1998-2002, encouraged by a favourable economic climate especially in Greece. In 2001-2002, market prices fell significantly, often to below the cost of production; many companies incurred losses in 2002 which started a process of industry rationalisation.

33. Growth in production over the period was not matched by market development and although the volume demanded clearly grew, unit prices fell. The main cause of disruption on the markets was the rapid increase of Greek exports, especially in the autumn. Such exports were made without any planned strategy, and were essentially a stock clearing exercise without much thought for the end price received. Consequently the product has to some extent been devalued in the eyes of the consumer, and it will be difficult to restore former price levels.

34. There are important exceptions to the overall patterns observed above: prices for seabass have not declined to the same extent as seabream and for the most part this sector appears to have remained profitable. In addition, efforts to differentiate product (both seabass and seabream) on grounds of origin, size and quality appear to have been successful in Italy, Spain and France, where price levels for home produced product do not seem to have been as badly affected as those for Greek imports.

35. Production is anticipated to fall back in the short term, driven mainly by industry rationalisation in Greece. This is likely to result in a more efficient industry and one that is hopefully more in tune with the market. Growth in demand and production is expected to rise in the longer term, but will require a concerted effort by all producers, especially on the following fronts:
    - market research to determine consumer requirements, followed by action to promote existing products and development of new ones
    - improved production planning to shift production away from the weak autumn market to the stronger summer market
    - continuing efforts to bring down costs of production
    - implementation of effective quality assurance schemes, especially emphasising traceability of product from producer to final consumer
    - Improved logistics to promote quality and minimise transit times for product delivery, especially for exports

36. One of the reasons for the crisis in the industry has been a lack of control of production in Greece by the authorities: actual production exceeds official production by a large margin, causing difficulties in overall industry strategic planning and management. Moves are now underway to rectify this.

Recommendations

37. A more effective means of recording actual production needs to be implemented in all countries, but especially Greece, together with a better system of administering and enforcing licence conditions.

38. There is a need for better production planning to ensure supply is more in tune with demand.

39. The use of EU structural support for the industry should be reviewed. In the short term funds should be mainly directed towards market development initiatives and measures to reduce production cost.

40. The evolution of the market should be continually monitored, and more effective planning and control of the development of the industry should be implemented.

41. Support for R & D should be strengthened, with emphasis on reducing production costs, delaying maturity, realising environmental benefits and new technologies for species and systems.

42. The design, implementation, management and monitoring of quality schemes should be encouraged and supported as an integral part of the enhanced marketing function.

43. Greater cooperation between producers, both nationally and internationally, should be encouraged, both on the production planning and marketing functions.

44. New product development should be market focussed and examine the fullest range of options including whole fish, gutted, headless, filleted and otherwise transformed products.

45. New product development should be more focussed on key attributes such as freshness, origin, traceability, image, environment, apposite pricing, and contemporary packaging.

46. Entry strategies for emerging North European markets should focus on comparative USPs (unique selling points) and infrastructure support rather than depending upon promotional spend alone.

47. The greatest emphasis should be placed in the short term on improving existing distribution and marketing channel infrastructures to the main markets.

48. The development of marketing organisations representing producers should be encouraged to allow more effective negotiation with larger customers.

49. Any promotion undertaken by the industry should be founded on sound marketing principles, ensuring that promoted attributes can be delivered.

Contents

1 Introduction 1
2 Methodology 2
3 The production of seabass and seabream 4
3.1 Evolution of the industry to date 4
3.2 Production 1998-2002 6
3.2.1 Ongrowing production 6
3.2.2 Overview of main producers 8
3.2.3 Differences between official and actual production 12
3.2.4 Capture fisheries production of seabass and seabream 15
3.2.5 Analysis of production by size grade 17
3.2.6 Seasonality of production 18
3.2.7 Fry production 23
3.3 Present structure of the industry 29
3.4 Costs of production 33
3.4.1 Production costs reported from different countries 33
3.4.2 Production cost variations 35
3.4.3 Scope for reducing production costs 36
3.5 Regulatory and structural context 36
3.6 Economic context 37
3.6.1 EU funding support 37
3.6.2 Other economic factors 40
3.7 Projections of production potential 40
3.7.1 Likely future development of the industry 40
3.7.2 Forecast production 44
4 The market for seabass and seabream 50
4.1 A contextual overview of the market for fishery products 50
4.2 International trade in seabass and seabream 50
4.3 Consumption of seabass and seabream 53
4.4 Market characteristics 57
4.4.1 General characteristics 57
4.4.2 Seasonality of demand 58
4.4.3 Current product forms in each sector 58
4.4.4 Costs and margins in the distribution chain 59
4.4.5 Marketing activities for seabass and seabream 59
4.4.6 Quality schemes for seabass and seabream 60
4.4.7 Interaction between farmed and wild caught seabass and seabream 60
4.4.8 Interaction between emerging aquaculture species and seabass and seabream 61
4.4.9 Actual or potential trade barriers 61
4.5 Future of the market for seabass and seabream 61
4.5.1 New product forms 61
4.5.2 Strategic options 63
4.5.3 Potential demand 2002-2008 65
5 The 2001-2002 price crisis 69
5.1 Introduction 69
5.2 Evidence for the crisis 69
5.3 Causes and impacts in different countries 73
5.3.1 Greece 73
5.3.2 Italy 74
5.3.3 Spain 75
5.3.4 Turkey 75
5.3.5 France 75
5.4 Was the price crisis caused by over production ? 75
5.5 Conclusion 76
6 The use of FIFG funds for the further development of the bass and bream industry 78
7 Conclusions and recommendations 79
7.1 Conclusions 79
7.2 Recommendations 83

Acronyms

ABG – Agricultural Bank of Greece
API – Associazone Pescicoltori Italiani (Italy)
APROMAR - Associacion Nacional de Productores de Cultivos Marinos (Spain)
CIHEAM – Centre International de Haute Etudes Agronomiques Mediterraneennes
EC – European Commission
EIA – environmental impact assessment
ERDF - European Regional Development Fund
ESF - European Social Fund
EU – European Union
FAO – Food and Agriculture Organisation
FEAP – Federation of European Aquaculture Producers
FGM - Federation of Greek Mariculture
FIFG – Financial Instrument for Fisheries Guidance
GAFRD - General Authority of Fish Resource Development (Egypt)
IFREMER – Institut Francais de Rechercher pour l'Exploitation de la Mer
INE – Instituto Nacional de Estatistica (Portugal)
IREPA - L'Istituto di Ricerche Economiche per la Pesca el'Acquacoltura (Italy)
ISMEA – Istituto di Servizi per il Mercato Agricolo Alimentare (Italy)
MAFF - Ministry of Agriculture, Fisheries and Food (Spain)
MAF - Ministry of Agriculture (France)
MAP – modified atmosphere packaging
MoA – Ministry of Agriculture (Greece)
NPD – new product development
NSSG – National Statistical Service of Greece
SFAMN - Syndicat Francais de l'Aquaculture Marine et Nouvelle (France)
SIS – State Institute of Statistics (Turkey)
SME – small to medium size enterprise
USP – unique selling point
VSP – vacuum skin packaging

1 Introduction

This is the final report (draft) for the "Study of the market for aquaculture produced seabass and seabream species" (FISH/2003/05) commissioned by the European Commission (EC) Directorate General of Fisheries and carried out by the Department of Marketing and the Aquaculture Technology Centre, Institute of Aquaculture at the University of Stirling, in collaboration with a number of partners both within and outwith the EU.

The study has been carried out at the end of a period of rapidly increasing production and falling prices in the seabass and seabream production sector, leading to considerable instability and uncertainty in the industry. The EC has played a major role in the development of the industry from its earliest stages through the provision of structural funds, especially the Financial Instrument for Fisheries Guidance (FIFG). It therefore has a fundamental interest in knowing the current status of the industry and the market demand for its products, with a view to deciding on future support policies to the sector.

The aim of the study is to provide a detailed analysis of the production and marketing of seabass and seabream in Europe, to assess the causes and impacts of the 2001-2002 price crisis, and to evaluate the potential market demand for these species over the next 5 years.

The main body of this report draws on the country reports given in Annex 1 together with our overall interpretation of the situation. A full list of partners and the countries for which they were responsible is given in Annex 2. The Terms of Reference for the study are given in Annex 3.

Aquaculture plays an increasingly significant role in European fish supplies and has particular social and economic significance in rural coastal communities. The industry is worth around 400 million Euros at first sale value, involving close to 1000 production companies and employing in the region of 8000 FTE staff. The aquaculture industry overall contributes more than 20% of EU fish production, with bass and bream comprising 18% of EU aquaculture production.

The EU is the second largest importer of seafood products after Japan and has an overall deficit in fisheries products in the region of 3 million tonnes, worth approximately 10 billion Euros. Although highly successful, EU aquaculture production comprises around 8% of EU fish supplies (production plus imports), with sea bass and sea bream representing less than 1% by weight but around 2% by value. The declining price paid to producers for their product is in many respects a predictable function of supply and demand economics, and similar patterns of development have been seen in other sub-sectors, most notably salmon. However, given the overall picture of a fish trade deficit in Europe, the concept of over-production in the seabass and seabream sector must be evaluated with respect to specific market, financial and strategic options. This report investigates the actual situation and explores some of the ways in which the market for seabass and seabream may be developed and the industry strengthened in future.

2 Methodology

The University of Stirling led the study and has been responsible for the administration and enforcement of the various contracts, organization, assimilation, compilation and synthesis of the main report. Partner organisations were given individual but directed responsibility for reporting on the situation in one or more countries with which they were familiar, and their original reports are included in Annex 1. The Terms of Reference provided to the partners for the country reports followed those set out by the EC, with added instructions on methodology, as set out in Annex 3.

An important requirement was that all country reports followed a common format, and whilst this has largely been adhered to, there are inevitable differences between countries depending on the volume and detail of information available. In some cases subsequent interventions have been able to remedy data deficiencies whilst in others a principle of most pragmatic resolution possible has prevailed. Where significant reservations remain as to the validity of the data, and possible implications for any interpretation, these have been highlighted within the report.

Table 1: Partners involved in the study

Partner	Countries
University of Stirling	UK, Ireland, other minor countries, EU and international context
Lamans	Greece, Cyprus
IREPA	Italy
Megapesca	Spain, Croatia
University of Mersin, Faculty of Fisheries & ER-SU Ltd	Turkey
Marie Christine Monfort (Private Consultant in Seafood Marketing)	France
Bioestratégia Lda.	Portugal
Eva Roth (Private Consultant in Fisheries Economics)	Denmark, Sweden, Finland
LEI (Agricultural Economics Research Insitute, Netherlands)*	Netherlands, Belgium
Sherif Sadek (Private Consultant in Aquaculture)	Egypt/North Africa
JD Associates	Germany & Austria

The methodology for data collection was, as far as possible, the same between countries. This initially researched sources and accessed all available published and unpublished data held by relevant organizations; where possible verification of data was undertaken by triangulation of data and interpretations. A wide range of government agencies, producer associations, research organizations and universities were involved in this process to enable the fullest coverage within the time and resources available. Having analysed the secondary data comprehensive interviews with sector stakeholders and other relevant participants in the seabass, seabream and related organizations and businesses within the supply chains were interviewed.

The style of interview adopted was left to the determination of the researcher concerned, subject to them satisfying a list of topics to be covered. In some cultures more formal structured interviews were prepared and administered whilst in other cases semi-structured in-depth interviews were used. Respondents were selected at an apposite level of seniority from within fish producers, fish processors, wholesalers, traders and other market chain intermediaries, buyers from within the catering and retail sectors (specialists and supermarkets) along with regulatory officials and those with other administrative capacities. Given the tight time constraints under which the research was conducted, purposive sampling was selected so as to ensure that key players could be incorporated within the exercise. Clearly there may be some scope for bias in this approach, but we are confident that this has been minimized and in any event is a commonly used technique in this type of market research.

Where appropriate, sector researchers were also contacted to discuss preliminary findings and to assess reaction to initial interpretations. Through this structured application of each individual partner's own expertise and knowledge it was intended that a more accurate verification of the underlying situation would be revealed. This process also helped to more fully assess the validity of the information and to develop more realistic scenarios where data was otherwise lacking.

Interviews were conducted in each study country, and with transnational organisations, using face-to-face and electronic survey methods including telephone, video conferencing and e-mail. The objectives of the interviews were to collect quantitative information where possible, but especially to obtain qualitative information that helped the team understand the dynamics of the sector and market place and appreciate the interplay of the key factors affecting price and supply. Examples of the types of interviews held are given in the table below. Interviews were conducted by expert partners, which allowed for probing of replies and the pursuit of any new issues that emerged or were raised.

Table 2: Example Key contact interviews

Category	Examples
EU/European level organisations	Federation of European Fish Producers (FEAP) FAO SIPAM Network CIHEAM Networks TECAM & SELAM EC DG XIV
National organizations and agencies	Producer associations Government agencies concerned with aquaculture Marketing and Trades Associations
Market chain participants	Small and large producer companies Feed and seed suppliers Marketing and distribution companies Processors Wholesalers Multiple retailers Specialist fish retailers Hotel, restaurant and foodservice suppliers
Research organizations	Government funded research institutes Academic organisations involved in aquaculture and marketing research

In adopting this approach the study was able to draw on previous research that had been carried out into the European, Mediterranean and various related national aquaculture industries and markets. Many reports were already in the possession of the team, but others were identified and obtained during the start-up phase, through literature, bibliographic database and Internet searches and personal contacts; not all of these are commonly within the public domain and where requested, due commercial confidentialities have been observed. The reports compiled were read by various members of the team at the University of Stirling, again to ensure triangulation and a further opportunity to discuss possibly different interpretations of the analysis.

3 The production of seabass and seabream

3.1 Evolution of the industry to date

Aquaculture has a long history in the Mediterranean, with evidence of fish capture and fattening dating back more than 2000 years. Seasonal migrations of fish to and from coastal lagoons offered a ready opportunity to construct catching systems at the mouth of lagoons and thus impose a degree of management. This form of culture is widely practised today, especially in Italy where it is known as valliculture, although overall production is low, relying only on natural productivity and no artificial feeds.

The first efforts to breed seabass and seabream were made in the late 1970s and early 1980s in France and Italy, initially in government research laboratories and increasingly in the private sector. Ongrowing in these countries was typically carried out in land based systems using pumped seawater, later giving way to cage culture in countries with sheltered coastlines such as Greece and Turkey. Production remained low until the mid 1980s, but then started to grow rapidly, expanding from 1,100 tonnes in 1985 to 8,400 tonnes in 1990 (FAO). At this time, Greece was the leading producer (42%), with Italy (23%) and Turkey (12%) second and third largest.

The principal reason for the slow initial development of the industry was the difficulty in production of large quantities of good quality fry. One of the principal problems was inadequate inflation of the swimbladder at the larval stage, leading to extensive deformities in juveniles. This was eventually found to be caused by surface film pollution in hatchery tanks, and the development of an effective surface cleaner, together with improved hatchery design, feeds, hygiene, and know-how, lead to an increase in the supply of juveniles from the late 1980s onwards.

A further constraint in the 1980s was the difficulty in obtaining licences for what was still a relatively new coastal activity with little experience of potential impacts. Although this is still also an issue today, greater familiarity with the process in the 1990s led to an increase in licence availability especially in Greece and Spain.

With the main technical barrier to large scale hatchery production removed, the increase in production during the 1990s was rapid, and by 2000 had reached around 144,000t. This increase was aided by the availability of significant national and EU financial aid.

Production was particularly rapid in Greece thanks to the nature of its coastline and the availability of many sheltered sites, and by 2000 it had reached around 68,000t, some 50% of all Mediterranean production.

Hatchery technology has continued to improve, with advances in broodstock management, systems design, nutrition, and disease management, and unit productivity is now many times greater than it was in the late 1980s. This has been driven by the high fixed costs of hatcheries and the need to maximise production to spread costs and bring down unit costs.

Ongrowing technology has in many respects mirrored that of the salmon farming industry. Cage collar designs have evolved from wood and polystyrene in the early days, through steel to the widespread use today of plastic. True offshore systems eg using Farmocean and rubber hose technology, have also been installed in exposed locations such as Malta, Cyprus and Sicily, although production from these remains relatively low. Although most production is from cages, there is still significant production in land based tanks and ponds in countries such as Italy, Spain and France.

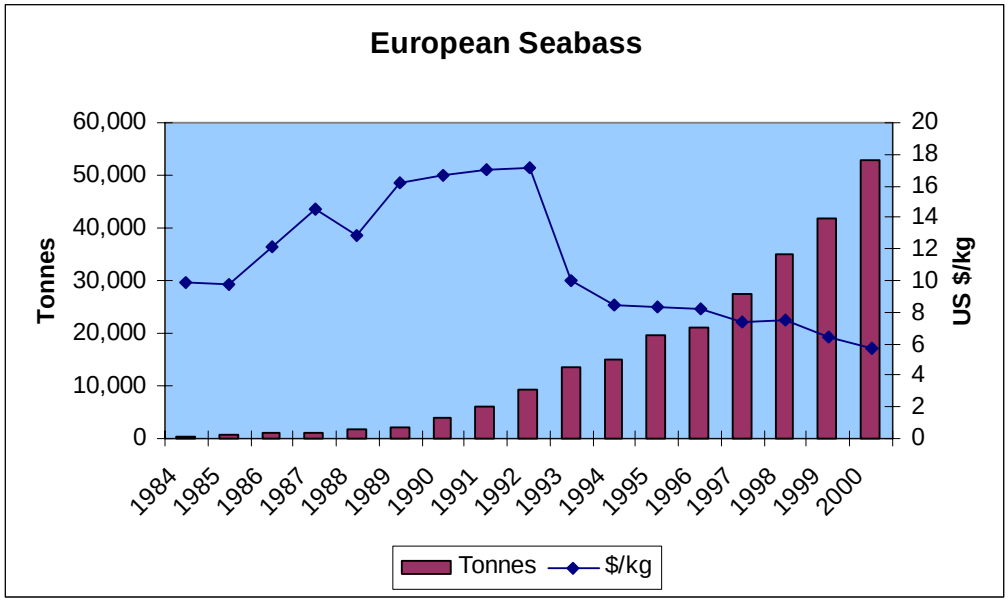


Figure 1: European seabass production and average value

Source: FAO

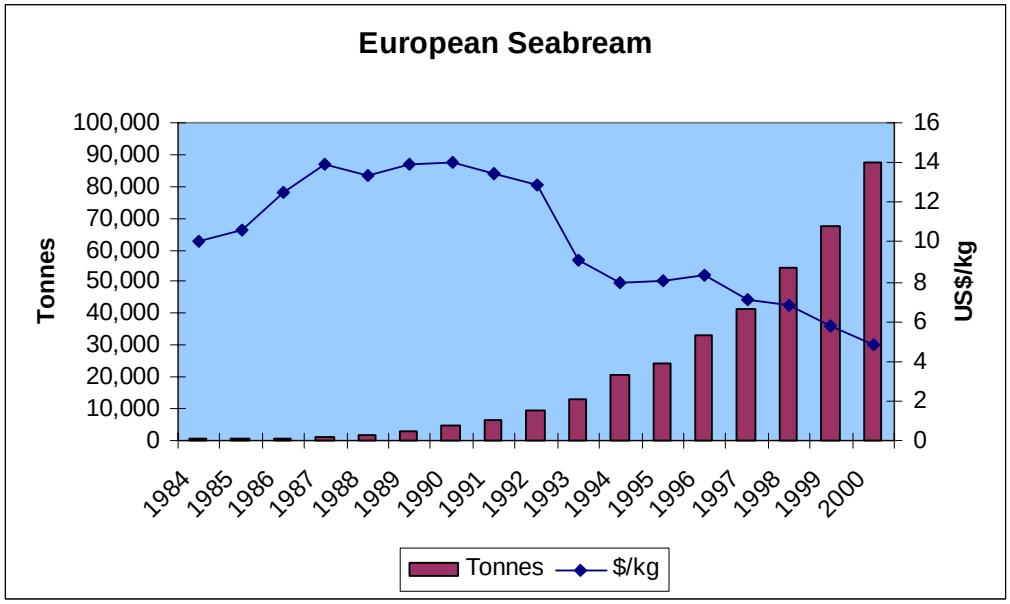


Figure 2: European seabream production and average value

Source: FAO

During the 1990s profitability was maintained due to improved survival (typically from 75% to 90%); higher growth rate (e.g. reduction from 19 months to 15 months to market); higher feed conversion ratio (e.g. from 2.8 to 2.1:1); and better productivity per person (e.g. from 10 to 27 tonnes per person in Greece). Scale economies were also achieved as average farm sizes increased.

However, by 2000 the biological limits to significant further improvement in feed conversion ratio and survival rates, the two most important variables affecting production costs, had been reached, and there have been no major reductions in production cost since that time.

Prices continued to fall in 2001 and 2002, often to below the cost of production, resulting in a major crisis in the industry. Many of the entrants to the industry in the 1990s were encouraged by the ready availability of grants for capital expenditure, but inexperience and lack of knowledge of working capital requirements meant they were eventually forced to sell stock, often below normal harvest weight, to raise funds. Such sales were made without any promotion at a time of year when demand was low and often into an inadequate marketing infrastructure. This scenario was one of the main drivers behind the price crisis, and it is leading to rationalisation within the industry. In Spain, smaller producers have been absorbed by, or formed alliances with, larger producers for the purposes of marketing. In Greece, a similar process is taking place, but even there some of the larger quoted companies have gone into liquidation.

Despite the current crisis, it is anticipated that the industry will emerge strengthened and in better shape to continue meeting a steady demand for its products. With wild fish catches in the EU continuing to fall, imports increasing yet in demand elsewhere, and internal demand for fish products buoyant, the need for alternative supplies from aquaculture will remain.

3.2 Production 1998-2002

3.2.1 Ongrowing production

Seabass and seabream are currently produced in most countries bordering the Mediterranean Sea. The main producers are Greece, Turkey, Spain, Italy and France. Smaller producers are Portugal, Croatia, Cyprus, Israel, Malta, Egypt, Tunisia and Morocco. Production is just starting to register in Albania, Algeria and Libya.

Total production volumes and value for the period 1998 to 2002 are given in Tables 3 and 4. Production of both species has increased from 108,000 t worth €655 million at first sale in 1998 to 181,000t worth €764 million at first sale in 2002. Average first sale prices per kg however continued their downward trend over the period declining from €6.32/kg to €4.39/kg for seabass and from €5.79/kg to €4.07/kg for seabream.

Table 3. Aquaculture production of seabass 1998-2002 by volume and first sale value

	1998			1999			2000			2001			2002		
	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)
Greece	25,068	139,378	5.56	25,137	123,171	4.90	29,419	131,209	4.46	37,706	153,463	4.07	44,439	170,201	3.83
Turkey	8,680	59,024	6.80	12,000	62,400	5.20	17,877	80,447	4.50	15,546	54,411	3.50	14,339	49,470	3.45
Italy	5,850	43,758	7.48	7,200	52,128	7.24	8,100	54,351	6.71	9,500	59,470	6.26	9,600	61,440	6.40
France	2,500	19,825	7.93	3,150	22,586	7.17	3,600	23,868	6.63	3,000	17,400	5.80	3,500	19,250	5.50
Spain	936	7,675	8.20	1,227	7,438	6.06	1,837	10,875	5.92	2,306	12,342	5.35	3,180	16,568	5.21
Croatia	1,100	7,854	7.14	1,200	8,892	7.41	1,400	12,124	8.66	1,600	13,632	8.52	1,600	13,632	8.52
Portugal	800	5,744	7.18	1,120	7,269	6.49	1,070	6,153	5.75	1,350	7,169	5.31	1,300	6,903	5.31
Tunisia	300	2,412	8.04	184	1,619	8.80	198	2,035	10.28	461	4,333	9.40	648	6,091	9.40
Cyprus	206	1,432	6.95	298	1,994	6.69	299	1,854	6.20	383	2,279	5.95	422	2,739	6.49
Malta	80	396	4.95	80	315	3.94	234	728	3.11	206	651	3.16	300	948	3.16
Morocco	563	3,249	5.77	275	1,430	5.20	250	1,538	6.15	202	1,000	4.95	200	990	4.95
Israel	30	321	10.71	26	289	11.11	150	1,199	7.99	150	1,262	8.41	150	1,262	8.41
Egypt	89	721	8.10	37	259	7.00	120	816	6.80	125	750	6.00	130	689	5.30
Total	46,202	291,788	6.32	51,934	289,789	5.58	64,554	327,195	5.07	72,535	328,162	4.52	79,808	350,182	4.39

Source: Partner reports, FAO if gaps

Table 4. Aquaculture production of seabream 1998-2002 by volume and first sale value

	1998			1999			2000			2001			2002		
	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)
Greece	33,230	170,802	5.14	33,321	137,949	4.14	38,997	166,127	4.26	49,982	176,436	3.53	58,907	209,709	3.56
Spain	4,933	32,558	6.60	6,117	35,234	5.76	8,242	46,345	5.62	9,833	42,788	4.35	10,960	44,684	4.08
Turkey	10,150	61,915	6.10	11,000	51,700	4.70	15,460	61,840	4.00	12,939	41,405	3.20	11,681	40,884	3.50
Italy	5,500	34,045	6.19	5,700	38,247	6.71	6,000	38,760	6.46	7,800	42,276	5.42	9,000	50,400	5.60
Israel	1,643	17,597	10.71	2,210	24,553	11.11	2,511	20,239	8.06	2,500	21,300	8.52	2,500	21,300	8.52
Portugal	1,750	11,725	6.70	1,820	10,975	6.03	2,400	12,528	5.22	2,150	10,686	4.97	2,500	12,425	4.97
France	1,250	9,525	7.62	1,000	6,860	6.86	1,400	9,492	6.78	1,700	9,588	5.64	1,500	8,775	5.85
Cyprus	828	5,564	6.72	986	5,502	5.58	1,384	7,474	5.40	1,278	6,326	4.95	1,266	6,647	5.25
Croatia	650	4,641	7.14	650	4,817	7.41	700	6,062	8.66	900	7,668	8.52	900	7,668	8.52
Egypt	651	4,036	6.20	271	1,653	6.10	875	5,163	5.90	915	4,941	5.40	982	4,910	5.00
Malta	1,870	9,032	4.83	1,922	7,573	3.94	1,512	4,702	3.11	1,091	3,022	2.77	750	2,078	2.77
Tunisia	66	483	7.32	39	325	8.33	409	3,542	8.66	448	3,965	8.85	352	3,115	8.85
Morocco	161	898	5.58	466	1,981	4.25	400	2,204	5.51	304	1,207	3.97	300	1,191	3.97
Total	62,682	362,822	5.79	65,502	327,367	5.00	80,290	384,477	4.79	91,840	371,608	4.05	101,598	413,785	4.07

Source: partner reports, FAO if gaps

The proportion by volume and of value of seabass to seabream has remained much the same at 45% to 55% respectively.

Greece is by far the most significant producer, accounting for 57% of all production in 2002, with production of 44,000t seabass and 59,000t seabream (see Figures 3 and 4). Turkey is next in importance with production of 14,000t seabass and 12,000t seabream in 2002 (14% of all production).

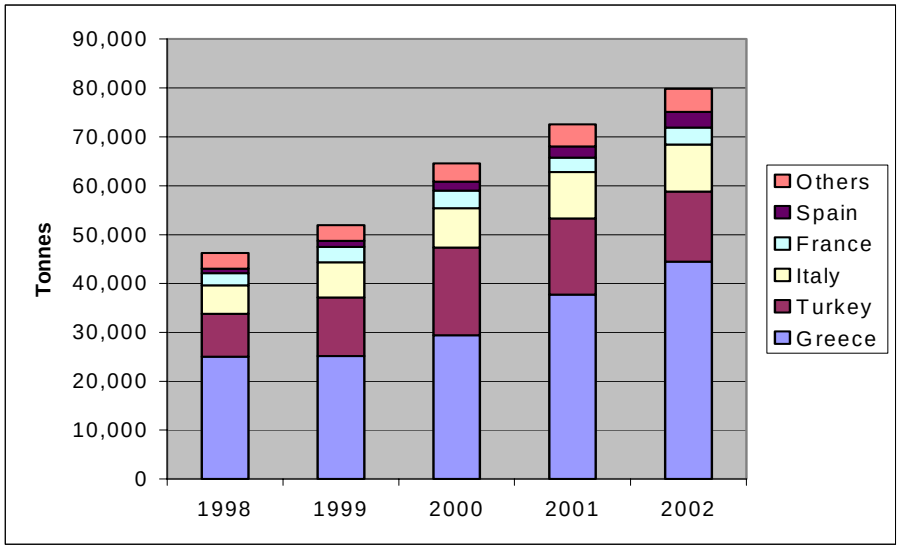


Figure 3. Production of seabass 1998-2002.

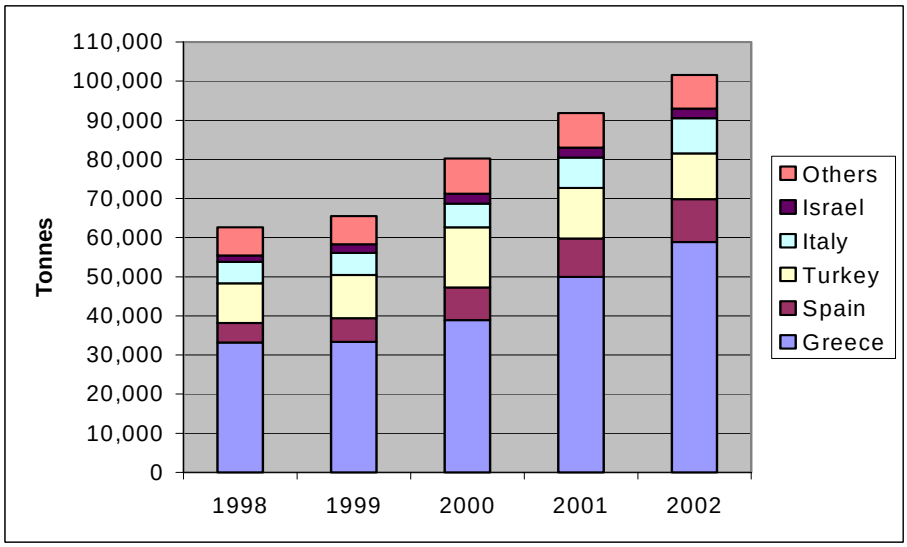


Figure 4. Production of seabream 1998-2002

3.2.2 Overview of main producers

Different aspects of each production industry are analysed in detail in other parts of this section. However, what follows is a brief overview of the five countries accounting for 90% of production in 2002, namely Greece, Turkey, Italy, Spain and France (see Table 5).

Table 5. Production of seabass and seabream, growth in production 1998-2002, and % share of production by country in 2002

	1998	1999	2000	2001	2002	% increase 1998-2002	% share of production
Greece	58,298	58,458	68,416	87,688	103,346	77%	57%
Turkey	18,830	23,000	33,337	28,485	26,020	38%	14%
Italy	11,350	12,900	14,100	17,300	18,600	64%	10%
Spain	5,869	7,344	10,079	12,139	14,140	141%	8%
France	3,750	4,150	5,000	4,700	5,000	33%	3%
Portugal	2,550	2,940	3,470	3,500	3,800	49%	2%
Israel	1,673	2,236	2,661	2,650	2,650	58%	1%
Croatia	1,750	1,850	2,100	2,500	2,500	43%	1%
Cyprus	1,034	1,284	1,683	1,661	1,688	63%	1%
Egypt	740	308	995	1,040	1,112	50%	1%
Tunisia	366	223	607	909	1,000	173%	1%
Malta	1,950	2,002	1,746	1,297	1,050	-46%	1%
Morocco	724	741	650	506	500	-31%	0%
Total	**108,884**	**117,436**	**144,844**	**164,375**	**181,406**		

Source: country reports, FAO

Greece

Production in 2002 was 103,000t, making Greece by far the largest producer (57% of production). 80% of production is exported, mainly to Italy and Spain. Production in Greece was stable in the late 1990s, but then increased rapidly between 1999 and 2002. Production is 57% bream and 43% bass, with less than 1% new species.

The sheltered and extensive coastline offers many suitable sites for cage farming, and ideal environmental conditions. In addition it is close to Italy, the main market, and has benefited from favourable EU and national funding support, together with considerable investor interest. The sector provides employment to over 10,000 people often in remote rural areas without other forms of employment. Fish, principally farmed bass and bream, is the third largest agricultural export after olive oil and tobacco, and is seen as a "strategic" product by the Greek government. Production is mostly in floating plastic cages and costs of production are among the lowest in Europe. Production sites are located all around Greece, but are most prevalent in the central regions close to good infrastructure and export routes through Patras (see Figure 5).

Figure 5. Map of Greece

There are 377 licensed sites operated by 167 companies, with 25 companies producing around 50% of production in 2002. The top 3 companies in production terms are Selonda Aquaculture SA, Nireus Chios Aquaculture SA, and Hellenic Aquaculture SA. These and other large operations quoted on the Athens stock exchange, were responsible in 2002 for a third of ongrowing production and two thirds of fry production. The ongrowing sector is still however dominated by medium and small producers, and the larger companies, despite having well financed sales and marketing departments, have not been able to bring order to the marketplace.

The increase in production in Greece has been rapid, and has happened without any serious and coordinated effort to promote the product either at home or on export markets. The Greek product is seen as a threat and a destabilising influence on many export markets due to uncoordinated sales and marketing. Prices have declined to a level at or below cost of production, bringing crisis to the industry which is likely to lead to a fall in production in coming years and a period of rationalisation.

Turkey

Turkey is the second largest producer of bass and bream accounting for 14% of production in 2002. 25% of production was exported in 2002, mainly seabass to Italy. Production peaked in 2000 at 33,000t, falling to 25,000t in 2002, mainly due to the internal financial crisis in Turkey and disruption caused by devaluation of the Turkish lira. Production is slightly greater for seabass. There is a strong and growing home market especially for seabream.

Turkey also has an extensive and sheltered coastline offering many suitable cage farming sites. The industry originally developed on the basis of wild fry grown in wooden cages, often on unlicensed inshore sites. Quality control was poor resulting in 1998 in an EU ban on imports from Turkey. The industry has now matured: the use of wild fry has been banned, cages are now mostly plastic on offshore (but still sheltered) sites, there are no unlicensed operators, the packing sector meets EU hygiene standards, and there is greater professionalism in the industry. Development has been achieved without the benefit of grants as enjoyed by EU countries, and production costs are significantly lower than in other countries.

There are 219 licensed farms, with 55% producing less than 100t, and 45% 100-1000t in 2002. The scene is however changing quite rapidly, with a number of larger companies, three with foreign investment, emerging eg Kilic Seafood (local) and Fjord-Marine (Norwegian) which have plans to produce 3-7000t p.a. each. Production is mostly in cages and is centred around Mugla and Izmir provinces (see Figure 6).

Figure 6. Map of Turkey

Owing to the more stable financial environment, strong domestic demand and prices, and low production costs, the general mood in the industry is positive. However, there are clear intentions by leading companies to significantly increase production, which if not properly planned especially on export markets could lead to instability.

Italy

Production in 2002 was nearly 19,000t, some 10% of overall production and split evenly between bass and bream. Production has increased steadily over the past 5 years (64% increase). Italy has the largest market for bass and bream, importing around 46,000t in 2002.

There are 122 sites at many locations around the coast (see Figure 7). 60% of production is from land based units, and much of cage farming is on true offshore sites, so production costs tend to be higher than elsewhere. The industry is dominated by smaller producers. Further development is hindered by strict licensing laws and lack of sheltered sea sites.

Figure 7. Map of Italy.

Spain

Production in 2002 was 14,000t (8% of total), 80% being seabream, and has grown rapidly over the past 5 years (141% increase). Spain has the second largest market for bass and bream and imported over 20,000t in 2002.

There are 67 farms, and 30 new ones in the pipeline. The most promising areas for cage farming are the south Mediterranean coast and the Canaries (see Figure 8). 70% of production in 2002 was from cages and the rest from ponds and tanks. There are 3 leading producers (>1000t p.a.), Culmarex, Adsa and Cupimar, and 50% of production is from farms producing more than 500t p.a. Rationalisation of the industry has taken place over the past three years, and there are now mainly 4 companies taking the lead on marketing and distribution. There is a continuing desire to increase production.

Figure 8. Map of Spain

France

Production in 2002 was 5,000t, 70% of which was bass. Production has grown by 33% over the past 5 years but is not expected to increase greatly in the future due to land ownership and legal issues restricting availability of sites.

Production is equally split between Atlantic and Mediterranean coasts (see Figure 9). 55% of production is from land based farms, 45% from cages, suggesting average costs of production are greater than elsewhere. Notable companies are Aquanord and Cannes Aquaculture producing over 1000t p.a. each.

Figure 9. Map of France

3.2.3 Differences between official and actual production

The official data on production and value in most countries is typically collected by a government department. In addition, national producer associations also carry out surveys of their members' production, and this may differ from the "official" (typically ministry) source. In addition, actual production may still differ significantly from either of these sources. A review of the main discrepancies indicated in the country reports now follows.

Greece

As Greece is by far the largest producer and the principal exporter, it is particularly important to have a clear picture of its production. Statistics have been compiled over the years by at least four parties, including the National Statistical Service of Greece (NSSG), the Agricultural Bank of Greece (AGB), the Ministry of Agriculture (MoA) and the Federation of Greek Mariculture (FGM). In 1998, the MoA took over compilation from the AGB. The NSSG has correspondents at the prefectural level (there are 53 prefectures in Greece) who visit farms and record data given to them. The MoA has fishery supervisors also at prefectural level who collect production data and supposedly ensure that farms are operating in accordance with their license conditions. The MoA data is generally regarded as the "official" data source. The FGM represents the great majority of Greek producers, and collects production data from its members. The FGM statistics are also used by the Federation of European Aquaculture Producers (FEAP). A comparison of the different production estimates is given in Table 6.

Table 6. Comparison of production estimates for Greece (seabass and seabream)

	Production (tonnes)				
Source	**1998**	**1999**	**2000**	**2001**	**2002**
FGM/FEAP	33,000	48,000	59,000	61,000	70,000
NSSG	40,400	57,900	65,200	66,000	84,110
MoA	30,800	41,500	49,100	56,100	64,700
Lamans	58,298	58,458	68,416	87,688	103,346

*NSSG figure for 2002 is an estimate

The MoA estimates are consistently lowest, most likely reflecting the fact that producers do not wish to declare production in excess of their licensed capacity with the MoA being the party in charge of monitoring licences. The total capacity of licences granted by the MoA is for 51,500t seabass and seabream and 32,100t new species (total 83,700t). However, around 20% of licenses are for sites not yet in operation, suggesting total operating licensed capacity of around 67,000t. This is quite close to the production reported by MoA for 2002 of 64,700t, but given that new species production was reported by MoA to be only around 2,000t in 2002, it is clear that licensed capacity for new species is being used for bass and bream.

The NSSG estimates have typically been 20-40% higher than those of the MoA, perhaps reflecting less reluctance on the part of producers to declare figures closer to actual production. FGM figures are consistently mid way between those of the MoA and the NSSG (see Figure 5), suggesting that it is playing safe and simply basing its estimates on an average of MoA and NSSG data, rather than reporting actual production.

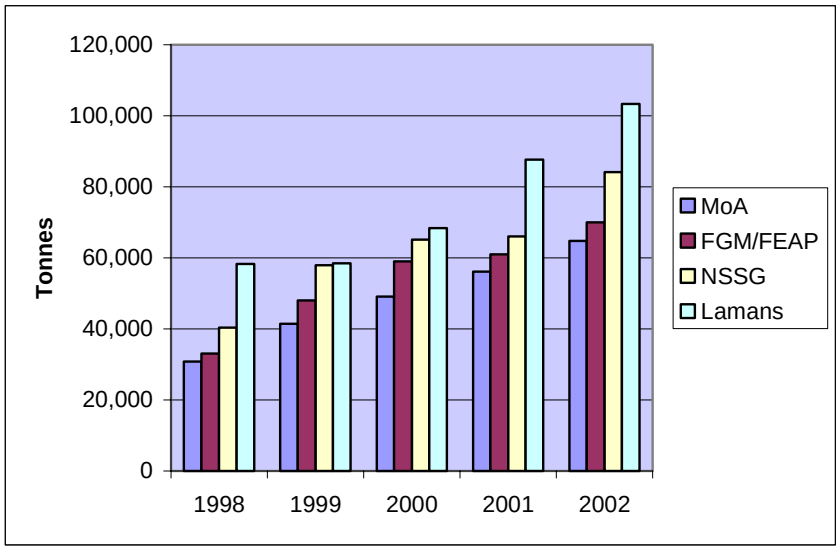


Figure 10. Comparison of production estimates for Greece, seabass and seabream

One of the main reasons underlying this reluctance to acknowledge actual production appears to be a fear by the industry that funds granted by the EU might be taken back if it is found that producers have not complied with the terms of their grant applications, and are producing more than originally proposed and in particular that they are producing bass and bream instead of new species.

In view of this situation, together with open acknowledgement by all in the industry that production is significantly higher than stated by any of the parties discussed, Lamans, the Greek partner for this study, has developed a model which is intended to more accurately reflect the true production situation. This model is based on information gathered through interviews with industry stakeholders at every level, and takes into account a host of factors including fry production, fry imports and exports, survival rates, and market size. The Lamans model estimates production at 60% higher than MoA estimates for 2002, and between 40% and 95% higher in other years. The results of the model have been backed up by those in the industry. A more detailed description of the model can be found in the Greek country report.

Given the significance of the discrepancy between the production statistics issued by official bodies and Lamans, together with acknowledgement by the industry of these discrepancies, the production figures for Greece used in this study are those provided by Lamans.

Turkey

Production data is collected through Provincial Directorates of Agriculture via producer declarations, and after vetting and verification at different stages is published by the State Institute of Statistics (SIS).

In the early days of the industry there were many unregistered sites, and as data was only collected from registered sites there were major discrepancies between official and actual production. Unregistered sites have now largely been removed. The sea surface area and cage number allowed for a licensed site is based on a production level proposed at the application stage. Although there is scope in practice to produce more than originally planned, monitoring schemes have improved and there have been cases of farms having excess cages removed by the authorities. The currently declared official production figures are believed to be reasonably accurate by those in the industry, and if actual production is higher, it is by no more than 10-15%.

Certainly the estimated hatchery production figure (less exports) of 78.5 million fry for 2002, believed to be similar in 2001, suggests production in the range of 23,000t compared with reported production in 2002 of 26,000t.

Italy
Production statistics for aquaculture are estimated by the Italian Association of Pisciculture (API) on the basis of fish feed consumed in any given year. Data on feed used is provided by feed companies such as Biomar and Trouvit. Clearly this method is open to question, and from 2003 a private company has been contracted to collect more accurate data. In the meantime, the figures provided are believed to be the most accurate available.

Spain
Official data collection is carried out by the Ministry of Agriculture, Fisheries and Food (MAFF) on the one hand, and by Associacion Nacional de Productores de Cultivos Marinos (APROMAR), which represents over 90% of Spanish production, on the other. There is generally good correlation between these two sources (see Table 7). The FEAP figures in the late 1990s, supplied by APROMAR, were apparently overstated by up to 20% to give a better impression of the industry with a view to improving financial support to the sector. Reporting of true production is not considered to be an issue with producers as licences are mostly based on volume or surface area occupied, rather than production tonnages. The MAFF figures are used in this study.

Table 7. Comparison of production estimates for Spain (seabass and seabream)

Production (tonnes)					
Source	**1998**	**1999**	**2000**	**2001**	**2002**
MAFF	5,869	7,344	10,079	12,140	14,140
APROMAR	7,118	6,404	9,072	11,428	14,140
FEAP	7,738	9,270	10,600	12,635	14,140

France
Statistics are produced by the Ministry of Agriculture (MAF) and Syndicat Francais de l'Aquaculture Marine et Nouvelle (SFAMN), which represents over 80% or producers. SFAMN figures have been 10-36% higher than MAF figures over the period 2000-2002 giving 3,500t seabass and 1,500t seabream in 2002 (5,000t total). Even these figures are believed by the industry to understate production, which in 2002 was considered to be 5,500 to 6,000t. Reasons for the discrepancy may be due to farms with registered capacity of less than 20 tonnes, which are subject to less stringent monitoring, producing more, and to black market sales by small producers. As this difference is small, the SFAMN figures have been used.

Portugal
Official data states that production in 2002 was 2,600t, whereas industry sources suggest this was around 3,800t (see Table 8). The reason for the discrepancy is believed to be partly black market sales and partly to undeclared production in excess of licensed capacity. Owing to the significant discrepancy, the industry figures have been used in this study.

Table 8. Comparison of production estimates for Portugal (seabass and seabream)

Production (tonnes)					
Source	**1998**	**1999**	**2000**	**2001**	**2002**
FEAP	2,900	2,444	3,140	2,700	3,000
INE	1,734	2,071	2,468	2,687	2,662
Industry	2,550	2,940	3,470	3,500	3,800

Croatia
There is no official data collection process, although this will start in 2004. Reported figures considered to be accurate, or if anything lower.

Cyprus
The industry in Cyprus is relatively small and tightly regulated. The official production figures are therefore considered to be accurate.

Egypt
Fisheries statistics in Egypt are compiled by the General Authority of Fish Resource Development (GAFRD). The statistics for bass and bream production appear to be quite inaccurate. According to official figures, production of bass from 1998-2002 varied from 840 to 10,000t p.a., and bream from 1,600 to 8,800t. However, a survey of farms for this study (see Egypt report) indicated that production of bass was most likely

under 150t pa and bream under 1,000t p.a.. Production in Egypt is mainly based on extensive and semi intensive pond culture using wild fry and little or no supplementary feeding. The figures used in this study are those based on the field survey.

Malta
Production in Malta has reduced in recent years due to the burden of a 15% tariff on exports to the EU and the greater profitability of tuna farming. Figures are considered to be accurate.

Conclusion
It is clear from this review that collection of accurate production statistics, which is of such vital importance to strategic industry planning, needs to be improved in Greece, the largest producer and exporter. For the most part, discrepancies in other countries are not significant in overall industry terms. Steps are now being taken in Greece to improve the collection of data at the prefectural level, and equipment has been issued for the establishment of a centralised information system for timely reporting of production. However, it is essential that appropriate training is given to data collection personnel, and that the political will is present to find out and report accurate data.

3.2.4 Capture fisheries production of seabass and seabream

Production of seabass and seabream from capture fisheries remains relatively static at between 16,000 and 20,000t per annum (see tables 9 and 10) .

As a proportion of all production, capture production has declined from 13.5% in 1998 to 11% in 2001 (see Figure 11).

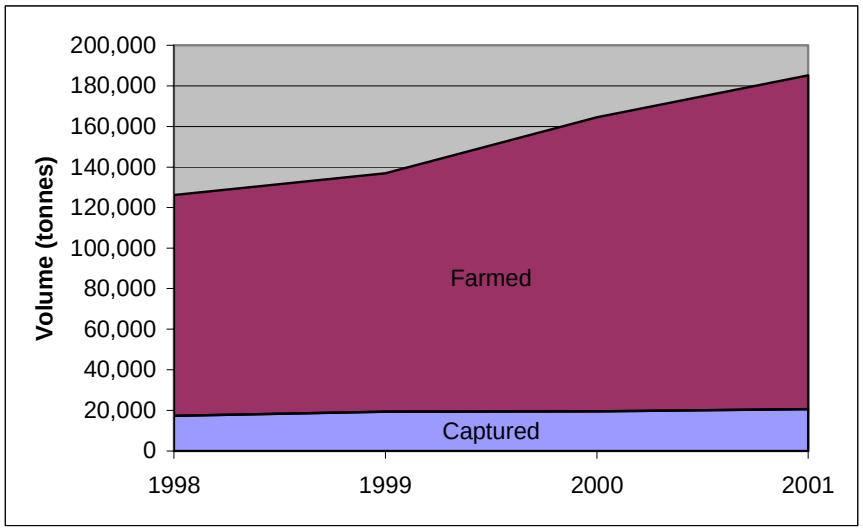


Figure 11. Capture production of seabass and seabream compared with farmed production

Seabass is the more important species with production in the region of 11-12,000t p.a. Seabream production has risen from 5,500t in 1998 to 8,800t in 2001, with a particularly noticeable rise in Spain thought to be due to escaped farmed fish being recorded as captured.

France, UK, Italy, Turkey and Egypt have significant bass fisheries. Production in Turkey has declined since 1998, thought to be due to the use of wild fry for aquaculture. Such use has now been banned however, and catches are expected to increase again. In France, 80-90% of the catch comes from trawling, and 10-20% from line fishing, with line caught fish fetching a 40-50% price premium over trawl caught. The wild bass fishery in France produces more than the farming sector (58% by volume, and 70% by value). The catch data for Egypt may not be reliable given the discrepancies found in aquaculture production data.

The principal fisheries for seabream are in Spain, Turkey, Italy and Egypt. Italy and Spain showed a rising trend in production from 1998 to 2002, and Turkey a declining rate (again thought to be due to the use of wild fry in aquaculture). Production in Egypt appears relatively static in the period 2000-2002.

Table 9: Capture fisheries production of seabass 1998-2002

	1998			1999			2000			2001			2002		
	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)
Greece	258			289			345			300					
Turkey	3,950	29,625	7.5	3,650	25,185	6.9	1,900	11,400	6.00	1,200	5,760	4.80			
Italy	1,889	23,575	12.48	1,881	24,735	13.15	2,195	27,372	12.47	2,735	36,458	13.33			
France	3,276	28,894	8.82	3,644	32,942	9.04	4,127	36,318	8.80	4,258	39,216	9.21	3,858	37,500	9.72
UK	501			687			404			457					
Spain	642	4,747	7.40	434	3,542	8.16	494	3,901	7.90	299	3,292	11.02	494	3,498	7.08
Croatia	31			20			22			11			5		
Portugal	317			374	3,493	9.34	454	3,723	8.20	409	3,566	8.72	398		
Cyprus										3	15	6.00	3	19	6.10
Egypt	945	7,655	8.10	1,308	9,156	7.00	2,167	14,736	6.80	2,316	13,896	6.00	2,715	14,390	5.30
Total	11,809			12,287			12,108			11,987			7,473		

Source: country reports, FAO

Table 10: Capture fisheries production of seabream 1998-2002

	1998			1999			2000			2001			2002		
	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)	Volume (tonnes)	Value (€ '000)	Value (€/kg)
Greece	125			142			248			176					
Spain	723	5,350	7.4	1,063	8,674	8.16	1,405	11,100	7.90	1,999	22,029	11.02	1,406	9,954	7.08
Turkey	1,400	9,520	6.80	1,655	9,930	6.00	830	4,316	5.20	1,070	4,280	4.00			
Italy	1,717	12,156	7.08	1,754	21,030	11.99	1,939	21,988	11.34	2,675	16,692	6.24			
Portugal	173			151	1,294	8.57	181	1,435	7.93	213	1,642	7.71	185		
France	331	2,353	7.11	361	2,238	6.20	368	2,521	6.85	353	2,002	5.67	433	3,399	7.85
Cyprus										37	192	5.20	45	234	5.20
Croatia	84			27			25			12			3		
Egypt	990	6,138	6.20	1,955	11,926	6.10	2,478	14,620	5.90	2,294	12,388	5.40	2,480	12,400	5.00
Total	5,543			7,108			7,474			8,829			4,552		

Source: country reports, FAO

Prices for captured seabass in France and Italy have increased slightly over the period 1998-2002, in stark contrast to farmed prices in the same countries (see Figure 12). In France and Italy, captured bass in particular is seen as a quite different product to farmed fish, often being significantly larger. Both traders and consumers perceive the wild product to be of better quality than farmed and are prepared to pay a premium. In Portugal too prices for both captured bass and bream have held up well.

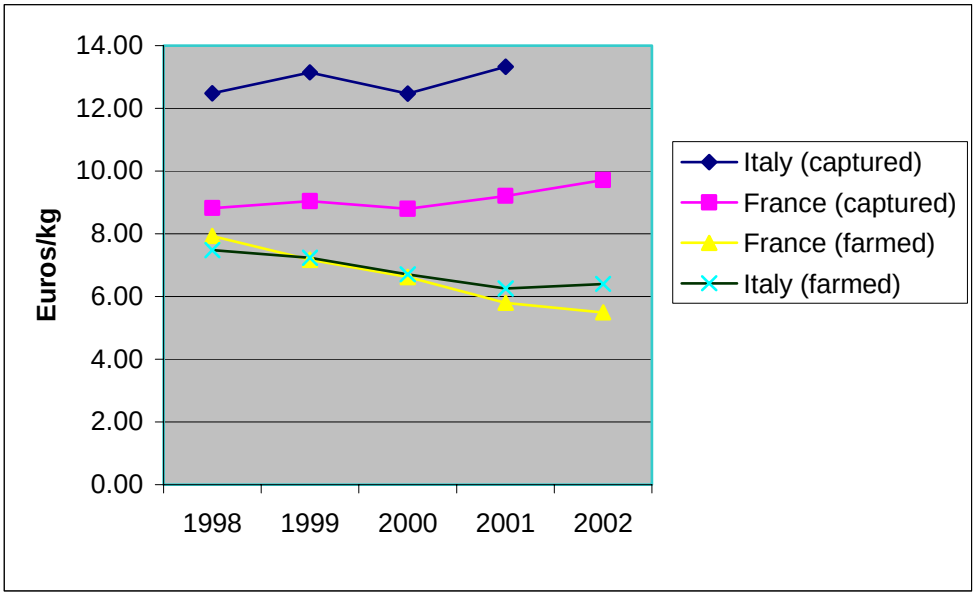


Figure 12. Trends in the price of wild and farmed seabass in France and Italy

Source: country reports

Prices for wild seabream have not held up so well, and in France have matched those of the farmed product. Prices for both wild bass and bream in Turkey have also declined in line with farmed prices, but still command a significant premium.

The capture fishery remains an important sector, but is not likely to increase significantly in volume in the future. It will continue to provide a niche product that is perceived to be of higher quality than farmed.

3.2.5 Analysis of production by size grade

The bulk of production to date has been in the range of 300g to 500g, but as the industry has matured and prices have reduced, producers have increasingly looked to differentiate their products through ongrowing to greater sizes which to date have also fetched higher prices.

In Greece, the bulk of production is still in the 300-450g range or less (see Table 11), with only 18-30% over 450g. The production of smaller sizes has been driven to some extent by the needs of cash starved smaller producers needing to sell at the earliest possible opportunity. As much of Greek production is exported, the arrival of smaller fish on Italian, Spanish and French markets has had a disruptive effect, and encouraged producers in those countries to consider production of larger sizes.

Table 11: Analysis of production by size grade in Greece

Percentage of production in each size category					
200-300g	*300-450g*	*450-600g*	*600-800g*	*800-1000g*	*1000g+*
11-17%	60-65%	14-21%	3-8%	1-3%	<1%

Source: country report

In Turkey, where most seabream is consumed on the home market, 90% of bream are in the 300-400g size, with consumers expecting 3 fish per kg as the norm. Seabass however have less home demand and a higher

proportion are exported, with 45% of fish being over 400g (see Table 12), and a growing trend towards production of larger sizes.

Table 12: Analysis of production by size grade in Turkey

	Seabass						Seabream		
	Percentage of production in each size category								
Year	200-300	300-400	400-600	600-800	800-1000	>1000	300-400	400-500	>500g
2000	15,0%	40,0%	30,0%	10,0%	5,0%	0,0%	90,0%	10,0%	0,0%
2001	15,0%	40,0%	20,0%	10,0%	10,0%	5,0%	90,0%	10,0%	0,0%
2002	15,0%	40,0%	20,0%	10,0%	10,0%	5,0%	95,0%	5,0%	0,0%

Source: country report

The production cycle for seabream to 300-400g in Turkey is around 12 months, so producers aim to stock in spring and sell in the peak summer market 1 year later; seabream are used to provide cashflow, whilst bass have a longer growth period of up to 18 months, but can be sold for a better price at larger sizes and a good profit margin.

In Italy, demand has traditionally been mainly for smaller fish, especially in the catering market which is the biggest sector in Italy. Production has therefore been targeted in the past at smaller sizes, but there is an increasing trend towards bigger fish (see Table 13).

Table 13: Analysis of production by size grade in Italy

	Seabass			Seabream		
	Percentage of production in each size category					
Year	<300g	300-500g	>500g	<300g	300-500g	>500g
1998	45,0%	50,0%	5,0%	30,5%	40,0%	29,5%
1999	35,0%	55,0%	10,0%	27,0%	45,0%	28,0%
2000	30,0%	57,5%	12,5%	20,0%	50,0%	30,0%
2001	25,5%	60,0%	14,5%	14,0%	67,0%	19,0%
2002	20,0%	65,0%	15,0%	12,5%	71,0%	16,5%

Source: country report

For both seabass and seabream there is a clear trend away from sizes of less than 300g over the past 5 years to sizes of 300-500g, and for seabass for sizes over 500g. Production of larger bream over 500g is however declining in favour of medium grades. The demand for fish of less than 300g has been increasingly met by imports from Greece and Turkey.

In Spain, there is also a trend towards production of larger fish, with 10% of bass and 5% of bream in 2003 expected to be over 800g. In France, production of large fish is seen to be particularly important as a means of product differentiation from small low cost imports from Greece, and a survey of producers in 2001 indicated 37% of production was of fish over 800g.

3.2.6 Seasonality of production

Seasonality of production varies from country to country, depending on growing conditions and market demand. In some countries production appears to be in tune with market demand, but in others there are imbalances that have contributed to the recent price crisis.

Much of this is influenced by the biological cycles of the two species: maturation occurs in both species after the fish undergo two winters in the sea (spawning in March-April for seabass and December-January for seabream). Over the second winter farms incur significant economic losses from 'winter disease[1]', damaged nets and a loss in body weight (15-20%) post maturation. Holding fish over winter (November to April) has been estimated to increase cost of production by €0.3/kg due to additional feed and losses. One farm in Greece that experienced extremely low temperatures in winter was forced to close due to the severity of this economic impact.

[1] winter disease caused by the bacterium (Pseudomonas anguilliseptica)

In response to this, the typical production cycle is based on stocking fry early in the spring to take full advantage of the rising seawater temperatures and maximise growth. Harvesting normally begins once the fish reach a marketable size in July the following year and peaks in the final quarter as farms try to reduce their stock before the winter. Although there is a lift in the market prior to Christmas, harvesting in the autumn is driven more by the biology of the species than by market demand.

Countries that have warmer winter growing temperatures ie those further south in the Mediterranean such as Turkey, Cyprus and Malta, and the Canaries in the Atlantic, are not as subject to these issues as more northerly producers and are thus able to plan production more effectively.

The above pattern is very much the case in Greece (see Figures 13 and14, and the large volume of product that comes onto the market in the autumn when demand is declining has a major impact on European market prices at this time of the year.

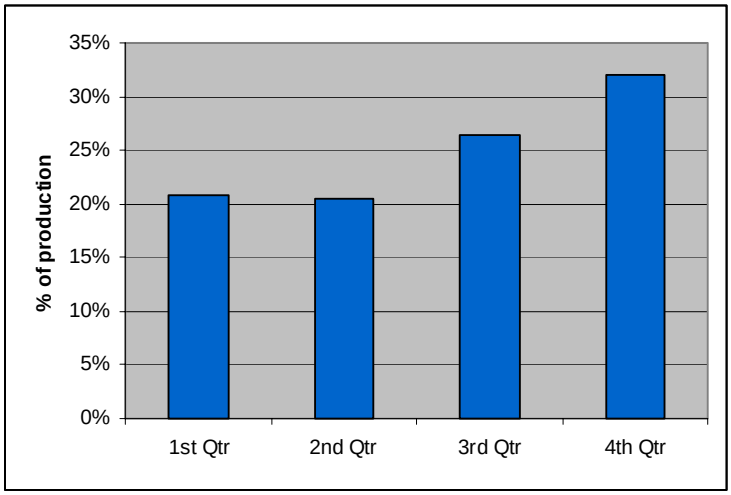


Figure 13. Seasonality of production of seabass in Greece (1999)

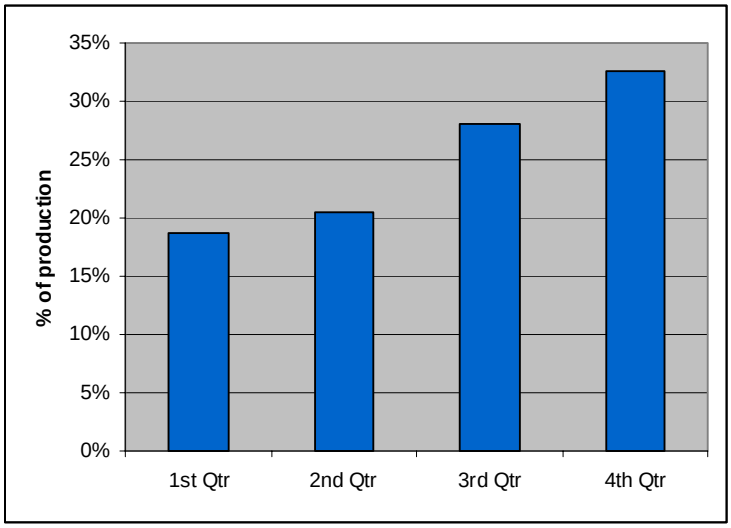


Figure 14. Seasonality of production of seabream in Greece (1999)

In Turkey, where the domestic market absorbs 65% of seabass and 90% of seabream, production appears to be quite well matched to market requirements (see Figures 15 and 16).

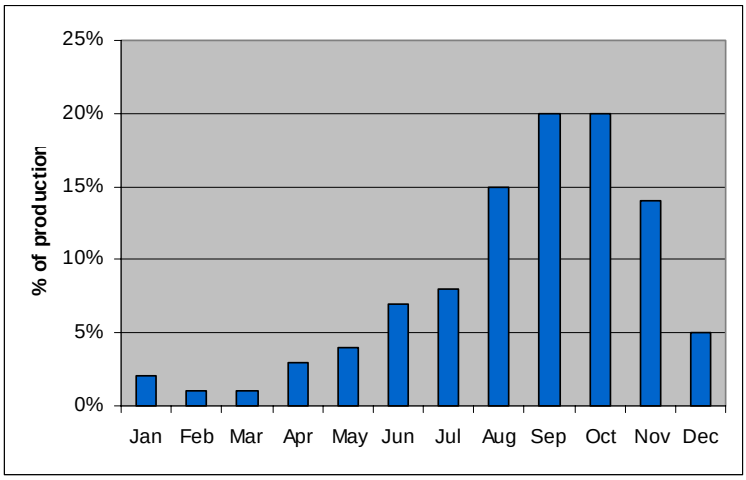


Figure 15. Seasonality of production of seabass in Turkey (average for period 2000-2002)

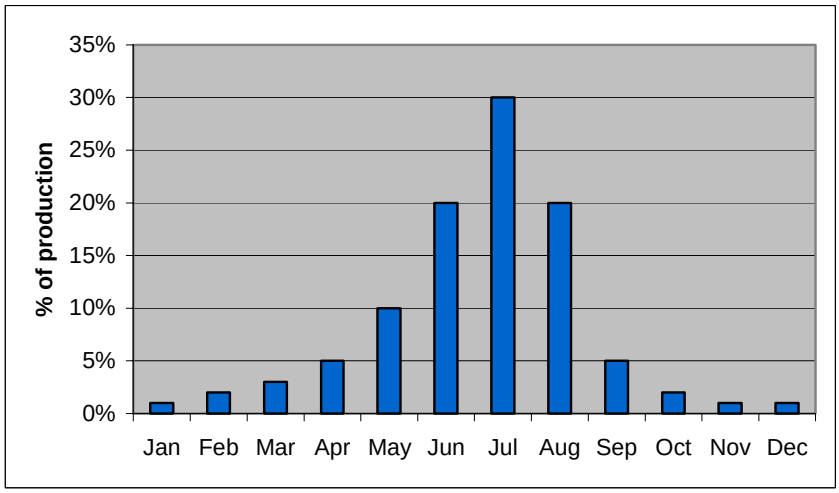


Figure 16. Seasonality of production of seabream in Turkey (average for period 2000-2002)

Fry of both species are stocked in the spring, aiming to harvest seabream 12-14 months later for the start of the peak summer market from April to August, and seabass (14-18 months later) for the late summer and autumn market from July to November. Seabass grown over 2 summers reach a good size and command a better price.

In Spain, 30% of seabass and 40% of seabream are produced in the last quarter of the year (see figures 17 and 18). Although market demand increases prior to Christmas, much of the production at this time is from farms wanting to clear out their stock to avoid some of the effects of the winter months when fish stop growing, and may even lose weight. Production from Spain's pond farmers (25% of production in 2002) may be particularly responsible in this respect given the colder water temperatures in ponds.

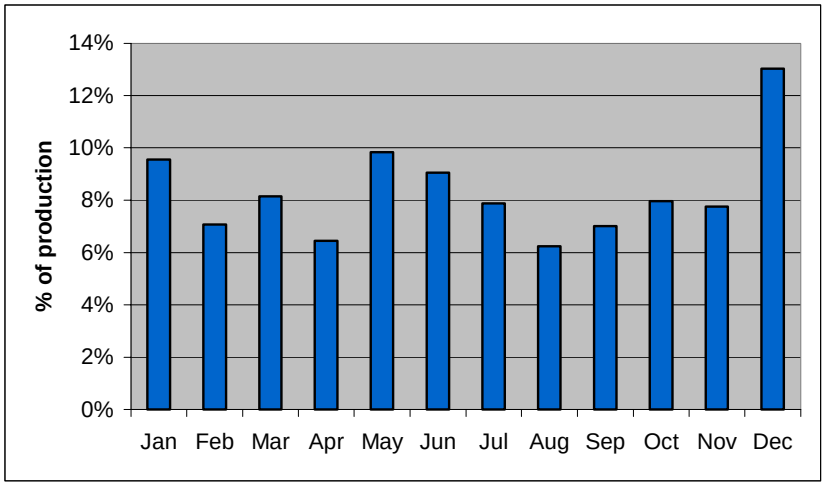


Figure 17. Seasonality of production of seabass in Spain (average for period 2000-2002)

The situation in Spain is exacerbated by an increased rate of imports from Greece in the autumn, all of which leads to a major decline in prices at this time of the year.

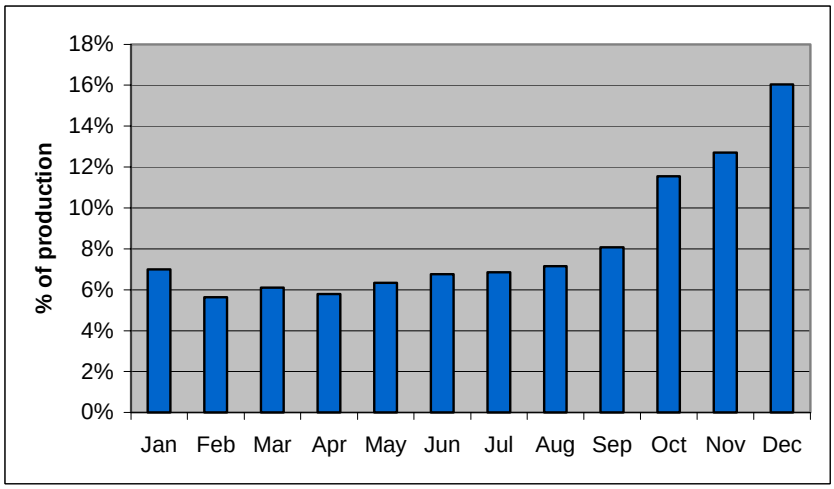


Figure 18. Seasonality of production of seabream in Spain (average for period 2000-2002)

In Italy, there is also a trend towards greater production at the end of the year for both bass and bream, but it is not as pronounced as in Spain (see Figures 19 and 20).

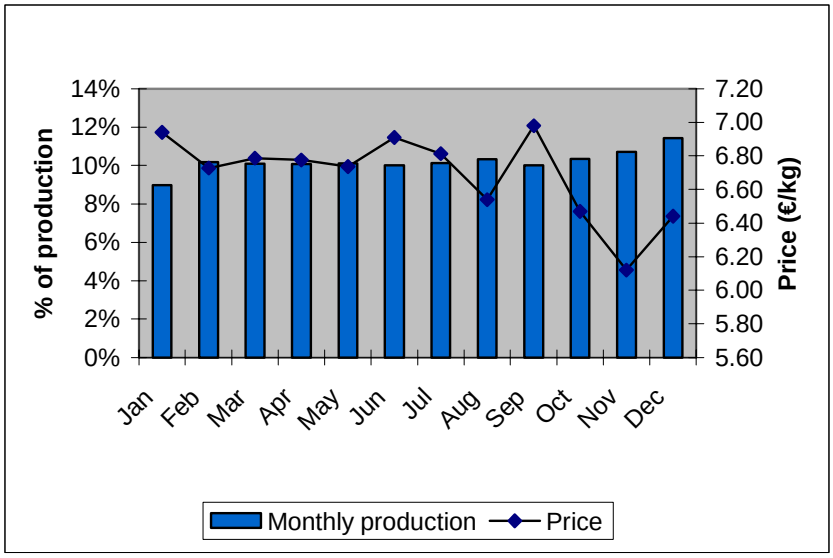


Figure 19. Seasonality of production and prices of seabass in Italy (average for period 1999-2002)

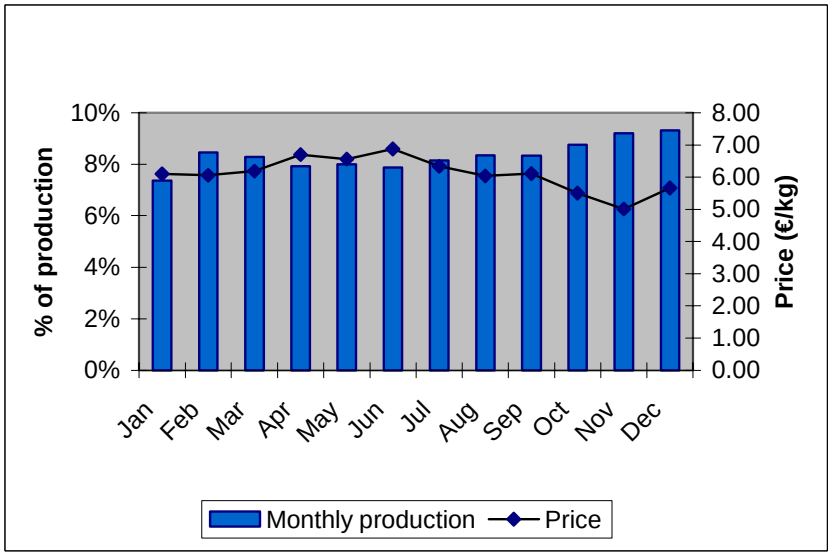


Figure 20. Seasonality of production and prices of seabream in Italy (average for period 1999-2002)

It may be seen therefore that there are major differences between countries and species as to seasonality of production. In Italy, for example production is relatively level throughout the year, perhaps a reflection on the predominant influence of traditional land based farmers who have mastered the production cycle and know very well what the market demands. Turkey is fortunate in having warmer water temperatures than elsewhere which allow it to harvest the bulk of its production in the summer and early autumn before demand starts to reduce. But for Spain and Greece in particular, farmers appear to be locked into production cycles which lead to an oversupply situation in the autumn and major imbalances on the markets.

In addressing the issue of concentrated volumes at the end of the year, some of the larger producers are now growing a greater proportion of their fish >600g and targeting different markets. In addition, larger producers are holding stocks over the winter despite the extra costs and risks in order to satisfy the demands of large multiple clients who want continuity of supply. Smaller producers need to take this into consideration and improve production planning accordingly. Selective breeding programmes might be introduced to reduce some of the impact in delaying the onset of maturity and lengthening the effective growing period. Such programmes have been successfully engaged to overcome maturation problems in the salmon and trout industry.

3.2.7 Fry production

In the early days of the industry in countries such as Turkey, and even today in countries such as Egypt, the production of seabass and seabream was based on the collection of fry from the wild. Wild fry is also still the basis of most valliculture systems. The massive growth in the industry has however come about through the production of fry in hatcheries on an increasingly large scale. Hatcheries in the early days producing 1 million fry p.a. were considered to be large, whereas nowadays hatcheries producing 10s of millions are the norm. With these increasing economies of scale and all round improvements in efficiency, the cost of fry has come down. In Greece, for example, fry cost has come down from an average of €0.48 in 1990 to €0.22 in 2003 for seabream, and from €0.42 to €0.21 for seabass. Fry still however represent 15-20% of the cost of production.

The trend in production of fry has closely followed that of ongrowing production. Production for the period 1998-2002 is given in Tables 14 and 15, and a summary of the situation is given in Table 16.

Table 14: Production of and trade in seabass fry 1998-2002

	1998				1999				2000				2001				2002			
Country	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)
Greece	80.0	5.2		85.2	90.0	7.7		97.7	110.0	9.9		119.9	120.0	9.5		129.5	129.0	8.6	1.2	136.4
Turkey				0.0				0.0	37.8			37.8	50.3			50.3	53.7		6.0	47.7
Italy	60.0		40.0	20.0	62.0		42.0	20.0	50.0		25.0	25.0	50.5		24.0	26.5	50.0		20.0	30.0
Spain	7.0		1.0	6.0	7.2		0.2	7.0	7.5		0.5	7.0	7.7	0.3		8.0	8.0	4.7		12.7
France	16.0			16.0	20.5			20.5	22.5			22.5	22.0		10.8	11.3	23.0		10.8	12.3
Portugal				0.0	4.5	0.2	0.3	4.4	7.0	0.2	0.5	6.7	8.3	0.2	3.0	5.5	7.0	0.2	2.0	5.2
Israel				0.0				0.0				0.0				0.0				0.0
Croatia	2.0			2.0	3.0			3.0	4.6			4.6	5.1	5.6		10.7	5.0	3.3		8.3
Cyprus	1.3		0.3	1.0	0.9		0.1	0.8	2.5		0.5	2.0	4.1		0.8	3.3	4.6		2.6	2.0
Egypt				0.0				0.0				0.0				0.0				0.0
Tunisia				0.0				0.0				0.0				0.0				0.0
Malta				0.0				0.0				0.0				0.0				0.0
Morocco				0.0				0.0				0.0				0.0				0.0
Total	166.3	5.2	41.3	130.2	188.1	7.9	42.6	153.4	241.9	10.1	26.5	225.5	268.0	15.5	38.5	245.0	280.3	16.8	42.6	254.5

Source: country reports

Table 15: Production of and trade in seabream fry 1998-2002

	1998				1999				2000				2001				2002			
Country	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)	Prod. (mill.)	Imp. (mill.)	Exp. (mill)	App. cons. (mill.)
Greece	90.0	6.8		96.8	105.0	10.3		115.3	140.0	13.1		153.1	180.0	12.5		192.5	171.0	11.4	1.6	180.8
Turkey				0.0				0.0				0.0	30.0			30.0	30.8			30.8
Italy	40.0		18.0	22.0	46.0		24.0	22.0	40.0		10.0	30.0	40.2		9.0	31.2	45.0		7.0	38.0
Spain	36.2		6.1	30.1	31.2		1.0	30.2	40.0		1.8	38.2	53.0		3.0	50.0	53.0		7.2	45.8
France	12.0			12.0	18.6			18.6	19.0			19.0	23.5		15.0	8.5	20.0		15.0	5.0
Portugal				0.0	11.3	1.8	5.3	7.8	12.2	1.8	5.9	8.1	13.8	1.8	8.7	6.9	12.0	1.8	2.0	11.8
Israel				0.0				0.0	6.4	2.0		8.4	6.4	2.0		8.4	6.4	2.0		8.4
Croatia	0.3			0.3	0.3			0.3				0.0	0.1	5.2		5.3	0.4	3.8		4.2
Cyprus	9.9		5.9	4.0	17.2		12.4	4.8	22.6		13.7	8.9	25.2		18.6	6.6	15.2		9.9	5.3
Egypt				0.0				0.0				0.0				0.0				0.0
Tunisia				0.0				0.0				0.0				0.0				0.0
Malta				0.0				0.0				0.0				0.0				0.0
Morocco				0.0				0.0				0.0				0.0				0.0
Total	188.4	6.8	30.0	165.2	229.6	12.1	42.7	199.0	280.2	16.9	31.4	265.7	372.1	21.6	54.3	339.4	353.8	19.0	42.7	330.1

Source: country reports

Table 16. Production of fry in 2002 – main producers, trade and apparent consumption

	Seabass				Seabream			
Country	Production (Million)	Imports (Million)	Exports (Million)	Apparent consumption (Million)	Production (Million)	Imports (Million)	Exports (Million)	Apparent consumption (Million)
Greece	129.0	8.6	1.2	136.4	171.0	11.4	1.6	180.8
Turkey	53.7	0.0	6.0	47.7	30.8	0.0	0.0	30.8
Italy	50.0	0.0	20.0	30.0	45.0	0.0	7.0	38.0
Spain	8.0	4.7	0.0	12.7	53.0	0.0	7.2	45.8
France	23.0	0.0	10.8	12.3	20.0	0.0	15.0	5.0
Portugal	7.0	0.2	2.0	5.2	12.0	1.8	2.0	11.8
Croatia	5.0	3.3	0.0	8.3	0.4	3.8	0.0	4.2
Cyprus	4.6	0.0	2.6	2.0	15.2	0.0	9.9	5.3
Total	280.3	16.8	42.6	254.5	347.4	17.0	42.7	321.7

Greece is the main producer of fry (300 million of bass and bream in 2002), and is also the main importer. Turkey is self sufficient, with a small export of seabass. Italy is a significant exporter, with 40% of bass and 15% of bream exported in 2002. Spain is an importer of bass and exporter of bream. France is the main exporter of fry, with 50% of bass and 75% of bream exported in 2002.

It may be seen from Table 16 that there is a significant gap between imports and exports for the countries shown. It is likely that export figures are more readily obtained than imports: interviews with hatcheries are likely to reveal more accurate export figures, whilst import data might only be obtained from trade statistics and therefore be less reliable.

The Greek partners in this study, Lamans, have developed a model for the estimation of overall production in Greece based on fry production, and this appears to have been successful in its predictions. It is reasonable therefore to take a similar approach to verifying overall production in the main producing countries based on fry produced.

The countries sampled for Table 17 accounted for around 95% of ongrowing production in 2002. Comparing this production with the theoretical production suggested by fry produced by those same countries in 2001 gives a close correlation (6% discrepancy overall).

Table 17: Comparison of actual ongrowing production in 2002 with that calculated from fry production in 2001, for a sample of 8 major producers

	Seabass		Seabream		Total	
Country	Actual production (tonnes)	Theoretical production based on fry use	Actual production (tonnes)	Theoretical production based on fry use	Actual production (tonnes)	Theoretical production based on fry use
Sample of main producers	78,380	75,059	96,714	110,756	175,094	185,815

The theoretical production is based on a figure of 3570 bass fry and 3360 bream fry per tonne produced; this assumes mortality of 20% and 15% for bass and bream respectively, and an average harvest weight of 350g.

There now follows a review of fry production in each of the major producing countries.

Greece

The same situation exists in Greece for reporting of fry production as it does for ongrowing production. Fry production is recorded by the same parties and suffers from similar inconsistencies for largely the same reasons. A full analysis is given in the Greek report. Lamans have carried out an extensive survey to determine actual fry production, and their figures are included in Tables 12 and 13 of that report.

A summary of hatchery capacity and production is given in Table 18. Greece has a total of 58 hatcheries approved, with a potential licensed capacity of 328 million fry of which around 40% is for new species. However, of these hatcheries only 41 are presently capable of operation (some are still being built), and of these only 36 are actually operating, with a licensed capacity of 261 million. The official production from these 36 hatcheries in 2001 was 251 million (MoA), whilst the production estimated by Lamans was 317 million, of which 17 were new species. Thus actual production was around 20% higher than licensed capacity, and most of the supposed "new species" capacity was used for bass and bream.

If all 58 licensed hatcheries came on stream with licensed capacity of 328 million, together with applications in the pipeline for an additional 69 million (total 397 million), this would be sufficient for production of around 130,000 tonnes, not taking into account any production in excess of licensed capacity.

Table 18. Hatchery capacity and production in Greece

	Licensed capacity (million)	Licensed capacity of potentially operational hatcheries (million)	Licensed capacity of hatcheries actually operating (million)	Production reported in 2001 by MOA (million)	Production in 2001 as estimated by Lamans (million)
Bass and bream	201	175	163	241	300
New species	127	110	98	10	17
Total	328	285	261	251	317
No. of hatcheries	58	41	36		

Source: Lamans SA

The reasons that new species capacity is being used for bass and bream are that the technology is not well developed for new species, there is uncertain market demand, and bass and bream are easier to produce, and have more attractive profit margins. Fundamentally, the new species that could be produced are too similar to bass and bream in the marketplace and would not achieve a sufficiently better price to justify their production.

There have been major reductions in cost of fry production, and selling prices have halved over the past 13 years (see Figure 21). A key factor in present day prices is whether credit is offered by the seller. Fry sold for cash cost around €0.19 each, whilst those sold with 14 months credit (or as long as it takes to grow to market size) sell for around €0.23.

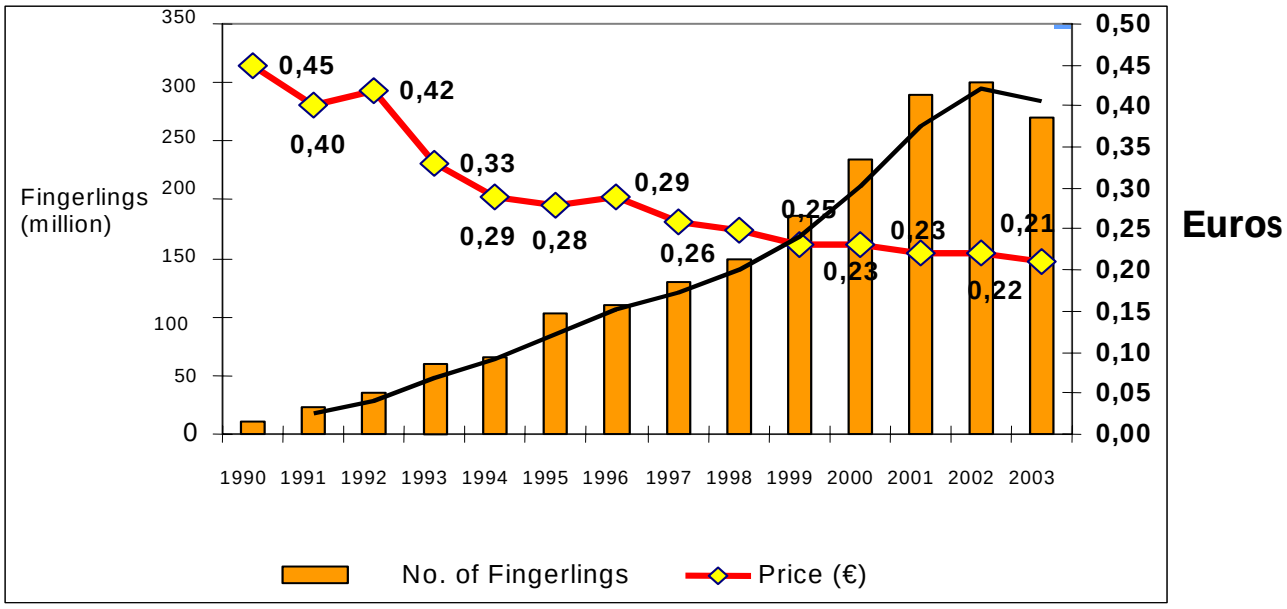


Figure 21. Production of seabass and seabream fingerlings in Greece and fry price trends *Source: ICAP 2003*

For the first time in 2003, hatchery production actually fell, from 305-310 million in 2002 to 260-280 million in 2003 (bass and bream). It seems that finally the industry has come to a turning point: the decline of market prices for the final product has finally impacted decisions on the stocking of fry, compounded by the inability of growers offered credit by hatcheries to meet their obligations. It is believed that the fry production industry will undergo a 2-4 period of rationalisation which will see closures, mergers and modernisation of hatcheries taking place.

Turkey

In the past, Turkey relied very heavily on the capture of wild fry, but this practice was banned in 2001. It is believed it may have continued to some extent in 2002, but by 2003 the ban was considered to have been largely successful.

Turkey has 21 licensed hatcheries with a theoretical capacity of 114 million, however in 2003 only 9 of these were operating. Production in 2002 was 84.5 million rising to 90 million in 2003 and expected to be 100 million in 2004. However, the biggest hatchery operator, has announced plans to produce 80 million fry alone in 2004, which if realised would mean production of nearly 160 million. Industry observers do not however believe that this level of production will be achieved. Hatchery capacity is not considered to be a limiting factor in Turkey, and certainly adequate for projected production over the next 5 years.

Prices of fry in Turkey are significantly lower than elsewhere:

Table 19. Fry costs in Turkey in 2003

	Seabass	Seabream
Cost of production	€0.07-0.1	€0.07-0.1
Sales price	€0.1-0.11	€0.15-0.16

However, given that mortality rates are higher (typically 25-40%) compared to other countries (10-30%), overall fry costs per kg of production are similar to other producers such as Greece.

Italy

Italy is a major producer of fry – in 2002 production was 95 million, of which 27 was exported mainly to Greece. Production is dominated by 3 large hatcheries which account for around 50% of production. There is an important sub sector in Italy which ongrows fry to fingerling size 10-15g. In addition, a number of companies have developed semi intensive methods of fry production, which give better quality at lower cost.

Spain
Production is largely in the hands of 5 companies, with 2 of those companies accounting for 50-60% of production. Production is mainly of bream (85% in 2002) and reached 61 million in 2002, of which 7 million bass were exported. Demand in the past was for fry of 8-10g, but this is now declining towards 2-5g. Prices in 2002 for fry were €0.23 for 2g fish (both bass and bream).

France
Production in 2002 was 43 million, rising to 53 million in 2003, and is dominated by 2 companies which account for 80% of that production. These 2 companies each specialise one in bream and one in bass and have affiliations with other companies either for ongrowing or for pregrowing. The sector is very much geared to exports, with 30% of bass and 80% of bream being exported in 2003 to mainly Italy, Spain and Greece.

The sector has higher costs for labour and energy than other producers, and is distant from its markets. However, it is relatively efficient, highly experienced, has a good reputation for quality, and is investing in R and D and genetic selection to try and remain competitive.

Other countries
Portugal is largely self sufficient in fry, whilst Cyprus is a significant exporter, especially of sea bream fry, to Greece and Israel. Croatia depends heavily on fry imports of both bass and bream from Italy and France.

3.3 Present structure of the industry

Over 80% of all seabass and seabream production is grown in sea cages moored near to the seashore in depths less than 40m. In Greece alone there are 377 cage sites producing over 100,000 tonnes (99% of national production) and in Turkey there are 188 registered sites producing 25,000 tonnes annually in cages (97% of national production).

Table 20: Industry structure by company size

Production (tonnes p.a.)	*<100t*		*100-500t*		*500-1000t*		*1000-5000t*		*<5000t*		
	No. of cos.	*% of prod.*	*No. of cos.*	*% of prod.*	*No. of cos.*	*% of prod.*	*No. of cos.*	*% of prod.*	*No. of cos.*	*% of prod.*	*Total cos.*
Greece	**13**	1%	**91**	19%	**35**	20%	**23**	25%	**4**	35%	166
Turkey	**186**	55%	**21**	13%	**10**	21%	**2**	11%			219
Italy	**77**	23%	**40**	55%	**5**	22%					122
Spain	**22**	6%	**28**	36%	**11**	31%	**3**	27%			64
France	**15**	10%	**6**	21%	**1**	9%	**2**	60%			24
Portugal	**119**	72%	**4**	28%							123
Total	**432**		**190**		**62**		**30**		**4**		**718**

Source: country reports

Table 21: Numbers of farm sites in the industry by type and principal producers

Country	Hatcheries	Nurseries	Tanks	Ponds/ lagoons	Cages	Total
France	5	1	4	1	20	31
Greece	36			1	377	414
Italy	20			74	48	142
Portugal	4		1	121	1	127
Spain	9	15	3	16	48	91
EU total	74	16	8	213	494	805
Turkey	21		1	18	188	228
Grand total	95	16	9	231	682	1,033

*Hatcheries - refers to licensed operational units only

Source: country reports

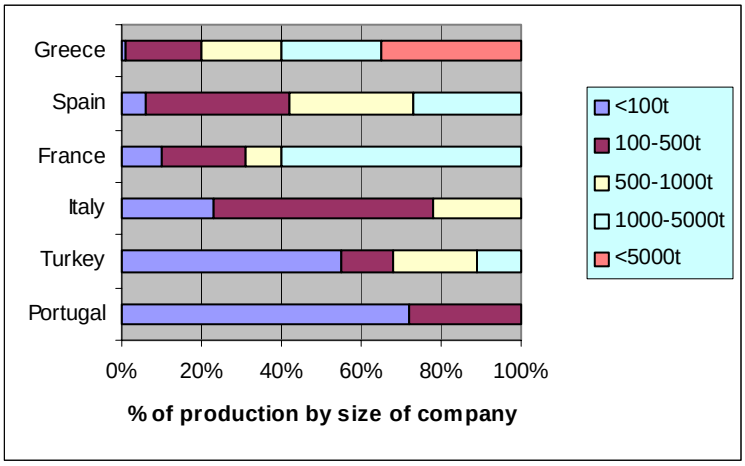


Figure 22: Industry composition by company size

Table 22: Proportion of production in different systems

	Tanks	Ponds/ lagoons	Cages	Total
Greece		1%	99%	100%
Turkey	1%	2%	97%	100%
Spain	3%	25%	72%	100%
France	53%	2%	45%	100%
Italy		63%	37%	100%
Portugal	11%	81%	8%	100%

Source: country reports

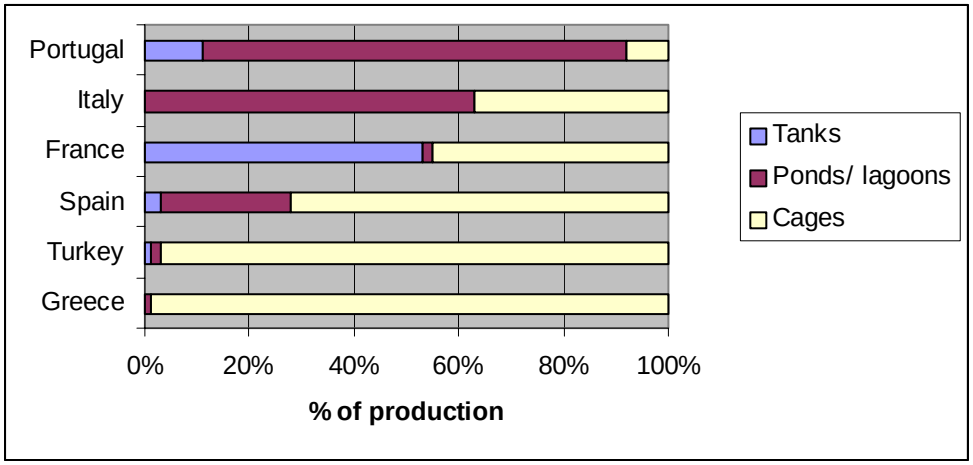


Figure 23: Relative importance of systems by country

Production is spread across more than 700 companies operating over 1000 hatchery and on-growing sites. The industry provides direct fulltime jobs for over 7,000 people in the main producing countries and indirect employment for service industries is thought to be a third as much again. The bench mark for productivity (collective production produced per fulltime employee) across the main producers in the industry was estimated to be 18.45 tonnes per capita (see table 23 below).

Table 23: Employment & productivity

Employess Country	Staff (FTEs)	Production tonnes	Production per person (tonnes)
Cyprus	73	1,682	23.0
France	405	8,091	20.0
Greece	3,138	65,000	20.7
Italy	2,153	18,600	8.6
Portugal	146	2,662	18.2
Spain	800	15,432	19.3
Turkey	855	28,220	33.0
Total	7,570	139,687	18.45

Source: country reports

In Cyprus all seabass and seabream are reared in cage units moored 1-2km from the shore and production licences are limited to 300 tpa for each site. The industry employs 73 people on 8 units and productivity (23 tonnes per capita) is above average due to efficiencies in the cage industry.

There are 166 producers in Greece, of those producing fry only 3 emerge with 48% of the total production. Companies involved in on-growing operations are better distributed and the largest 25 account for half of the national production. Despite this, 4 companies (operating multiple sites) produce more than 5,000 tonnes each year and several are listed on the Athens Stock Exchange with annual turnovers between €16 and 55 million. The Ministry of Agriculture has licensed 377 sites (not all are operating) along the Greek coast, however farms are unevenly distributed and 95 units are concentrated in one region, Central Greece (Sterea Ellada).

The industry in Turkey is developing rapidly and, following new environmental directives of 2000, recent investment in new cage farms has been made in near-shore locations. 97% of production is from cages and until recently many of these were located in shallow bays that conflicted with the tourism industry. During 1999-2002 36 licences for new larger scale farms were granted, 9 of these were for projects of ³500 tonnes. Foreign investment has increased development and in 2003 producer levels reached 3,500 tonnes with 8-10 other companies attaining 500-1000 tonnes. The productivity level reported for Turkey (33tonnes/person) was based on a relatively small sample size of farms and thus may be inaccurate. Figures of as low as 16t/person were reported

for small scale farms which still tend to dominate production in Turkey, thus average productivity can be expected to be lower than 33t/person. Large scale farms however reported production levels of up to 50t/person.

In France production methods are more diverse and production is split between tanks and cages. Four large intensive tank units based on the Atlantic coast account for around 55% of production, with the balance coming mostly from the 20 cage sites located on the Mediterranean coasts. However, production is dominated by two of the 24 producers and together they are responsible for 60% of all French output.

Production in Italy and Portugal is less typical and much is land based in tanks, ponds and lagoons. This is because the coastline is mostly unsuitable for proven cage technologies and operating new open-sea designs are not commercially viable. Ownership of the industry in Italy appears consolidated and only 14 companies control management of the 142 the hatchery and on-growing sites that are operating in the country. This is in complete contrast to the situation in Portugal where 123 companies own 127 farm sites.

Most of the Portuguese production (81%) is based along coastal areas that used to produce sea salt. These redundant evaporation ponds or lagoons have been converted to rear fish. Of the total production 33% is extensively farmed (low stocking densities and with some dependency on natural food and or fry entrapment), 63% is semi-extensive and only 4% is intensive. In Italy the land area under extensive and semi-intensive production is around 42,962 hectares and labour costs are the highest among producers. Detailed data on employment from Italy may show that farmers combine operating their farms with other part-time forms of employment, however, this is outside the scope of this study.

Although feed cost is low on less intensive systems, they are labour intensive and costs are much higher than for cages or tanks. Labour on a traditional extensive farm in Italy may be 63-76% of the total cost of production (see table: 24).

Table 24: Breakdown of production cost in ponds and lagoon systems in Italy

System type	Fry (%)	Energy (%)	Feed (%)	Labour (%)	Other (%)
Semi-intensive	12.0	25.0	17.0	42.0	4.0
Traditional extensive	0.0	21.0	0.0	65.0	14.0

Source: ISMEA, 2002

There are about 48 sea cage sites (about 630 cages) in Spain that produce 72% of the output. These are owned by 64 producers including 4 larger (>1000 tonnes per year) multi-site operators, one with sites in the Canary Islands. Around 16 pond farms with an area of 1,000 hectares are also cultured to produce 25% of the country's production. Farm units in the Canaries are disadvantaged by remoteness and transportation costs (estimated at €1.3 /kg by the EU Commission). However, financial compensation from the EU (POSICAN) and warmer annual sea temperatures that provide near constant year-round fish growth have made aquaculture viable.

3.4 Costs of production

3.4.1 Production costs reported from different countries

Recent technical and financial production data from the major producer countries, Greece, Italy, Spain, France, Portugal, and Turkey were analysed to provide indicative production costs, presented in table: 25 below. Seabass and seabream are often cultured on the same farms using identical commercial feed, growing facilities and similar husbandry techniques. The economics of growing each species varies little and financial assumptions have therefore been combined using data for 350g to 400g fish, the most popular size range. Accuracy of the economic data presented in the table may contain irregularities due to differences in methodology and sample size taken at source.

Table 25: Ex-farm production costs (€/kg) of seabass and seabream

	Greece 2002	Italy 2000	Spain 2002	France 2000	Portugal 2002	Turkey 2002	Average	% of total cost
direct costs								
feed(1)	1.68	1.50	1.46	1.41	1.30	1.65	1.50	35%
fry	0.67	0.90	0.79	0.91	0.79	0.65	0.79	19%
labour	0.55	1.10	0.50	1.07	0.75	0.30	0.71	17%
packing	0.25	0.25	0.42	0.62		0.25	0.30	7%
other (2)	0.27	0.10	0.50		1.00	0.13	0.33	8%
sub total	3.41	3.85	3.67	4.01	3.84	2.98	3.63	86%
indirect costs(3)	0.49	0.42	0.48	0.19	1.40	0.70	0.61	14%
TOTAL	3.90	4.27	4.15	4.20	5.24	3.68	4.24	100%

Source: Country reports

notes

(1) estimated costs may include irregularities due to partners calculations

(2) packing cost included in some countries

(3) accounting practice may vary between sources and depreciation/finance costs were included where identified

(4) costs are average for bass and bream, 350-400g size

Between the five major seabass and seabream producers in the EU, 300-400g fish are produced at just over four Euros per kilogram (ex-farm). Out of these five producers Greece, the largest producer, has the lowest costs of €3.90/kg, and Portugal with one of the lowest outputs, has the highest cost of €5.24/kg. Turkey, an important exporter to the EU, had rearing costs that were estimated to be €3.68/kg.

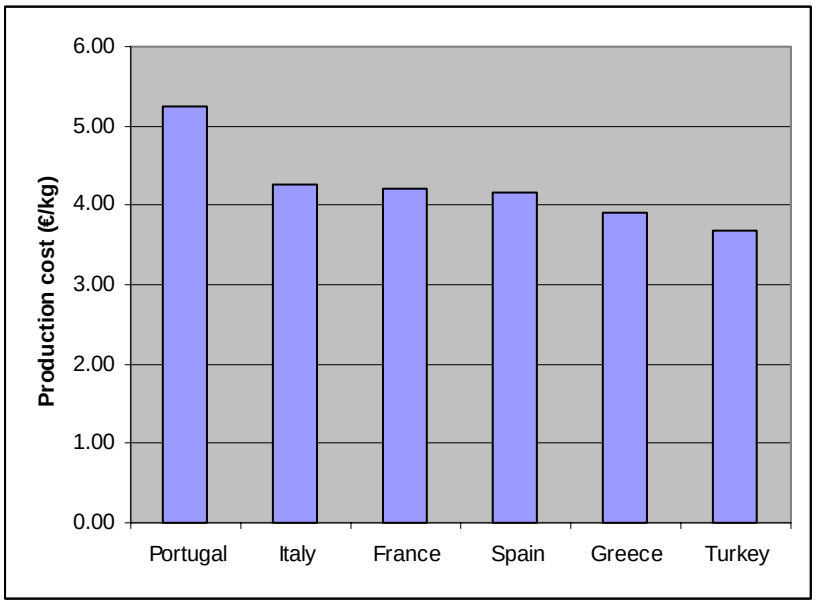


Figure 24: Production costs in the main producing countries

Within each country costs varied between farms depending on farming technologies employed, scale of investment and expertise. However, fish feed, fry/fingerlings and labour are the key financial inputs common to all operations forming 71% of farmer's expenditure.

Integrated companies, which produced their own fry for on-growing have a financial advantage. Growers without this depend on commercial hatcheries, often contracting a high proportion of their requirement several years ahead to secure supply, or aiming to purchase fry on the spot market where prices fluctuate with availability. Buying from third parties in Greece can mean the cost of fry is 40% higher than for integrated companies growing their own (€330/tonne lower production costs). It is therefore not surprising that larger companies in all countries produce the majority of their own fry.

Feed cost is mostly affected by a) on-farm feed management efficiency b) fluctuations in world market prices of the raw materials from which it is formulated c) farming technology employed and d) purchase conditions and discounts that might be negotiated with feed companies, although today these are very limited.

Marine diets for growing seabass and seabream share the same raw materials and most manufacturers do not make a distinction in formulation. The main ingredients, aquaculture fish meal and high protein cereals, are bought at world market prices. There is little, if any, difference between the automated manufacturing costs of commercial marine diets in the countries reviewed. Explanations for variations in feed costs between the producer countries are likely to be a consequence of the management techniques that are used with the production system. Production in Portugal is distinct in using extensive or semi-intensive systems that at times may provide some natural food and reduce the need to purchase commercial feed. In France intensively farmed tank systems provide better facilities to monitor the behaviour of the fish stock (health and feeding activity) whereby feed efficiency can be improved. Moreover feed management is enhanced by regular access to the fish stock which is sometimes impossible for consecutive days on offshore cage farms due to poor sea conditions. A considerable amount of feeding on cage farms is mechanised but not fully automated, this contributes to higher labour costs some of which is avoidable with fully automatic systems on land based farms.

Producing fish for export in Turkey is very competitive due to cheaper local labour, €0.30/kg, compared to Greece €0.55/kg or €1.10/kg in Italy. Logically this advantage should extend along its industry. However whilst the market price for fry was noted to be cheaper, this benefit was not apparent in the overall production cost. In Turkey bass fry were €0.11 and bream €0.15 compared to Italy and Spain where producers can expect to pay an average of €0.23 for bass and €0.26 for bream.

Higher labour costs in France, Italy and Portugal indicate not only the differences between wage levels, but are also characteristic of the level of labour required to manage the different production systems that are installed. Highly intensive units, like those in France, require less staff to operate them but often of a higher technical level. Conversely extensive ponds systems found in Portugal and Italy, are less demanding to operate but relatively inefficient. Offshore cagefarm systems involve comparatively low technology, relying entirely on tides and currents to exchange seawater through the nets, but vessels servicing larger units can be mechanised to make them labour efficient. Most onshore farms depend on electrical pumps to circulate and exchange the seawater in the holding facilities and oxygenation systems to maintain water quality backed up with alarm and independent stand-by electrical generation systems. This demands a high level of technical ability from the operators and often requires technical and engineering staff to be present or on stand-by 24 hours/day in case of mechanical failure.

In Portugal, indirect costs were highest but insufficient information prevents further analysis other than to note that the main type of system employed in this country are pond and lagoon operations, requiring less intensive farming methods than tanks or cage systems.

3.4.2 Production cost variations

A more detailed assessment of economic data in the table below shows variations across the Greek industry and reflects differences between farm size and the system technologies that they utilise. The variations in inputs below (especially fry, fuel and energy and management) emphasise the difficulty in accurately assessing the industry as a whole.

Table 26: Production cost sensitivity to variation in individual input values

Key cost inputs	*Min.*	*Max.*	*Range*
feed price (kg)	0.85	0.91	0.06
fry price (kg produced)	0.50	0.83	0.33
labour (kg produced)	0.50	0.53	0.03
diving (kg produced)	0.03	0.04	0.01
Insurance (kg produced)	0.12	0.15	0.03
Pharmaceuticals (kg prod)	0.07	0.09	0.02
Fuel & energy (kg prod)	0.02	0.06	0.04
Repairs & maintenance (kg produced)	0.04	0.06	0.02
Consumables (kg prod)	0.01	-	-
Other (kg produced)	0.01	-	-
Depreciation (kg produced)	0.23	0.29	0.06
Packaging (kg prod)	0.23	0.26	0.03
Management & Admin. (kg prod)	0.15	0.29	0.14

Source: Lamans SA

The economic advantage to growers in producing their own fry has already been discussed above. Between small independent growers purchasing fry and large scale integrated companies producing their own there may be much as €0.33/kg (40%) difference in production cost attributed to fry.

Fuel and energy consumption represents about 1% of total costs but between farms usage can vary by 67%. Typically this expense is for running seawater pumps, oxygenation and other machinery, vehicles, boats and refrigeration plant. The cost of repairs and maintenance required for this equipment can vary by up to 33%.

Individual farm sizes can be from <100 tpa to >5000 tpa and accordingly the costs of management can vary widely. Different accounting practises and methods of calculating management cost, especially in smaller units, can vary considerably. The range of cost allocated to management and administration was €0.15-0.29/kg.

3.4.3 Scope for reducing production costs

Production costs fell dramatically between 1989 and 1995, but since then have shown little sign of reducing below a floor of €3.50-3.70/kg in Greece (see Figure 25)

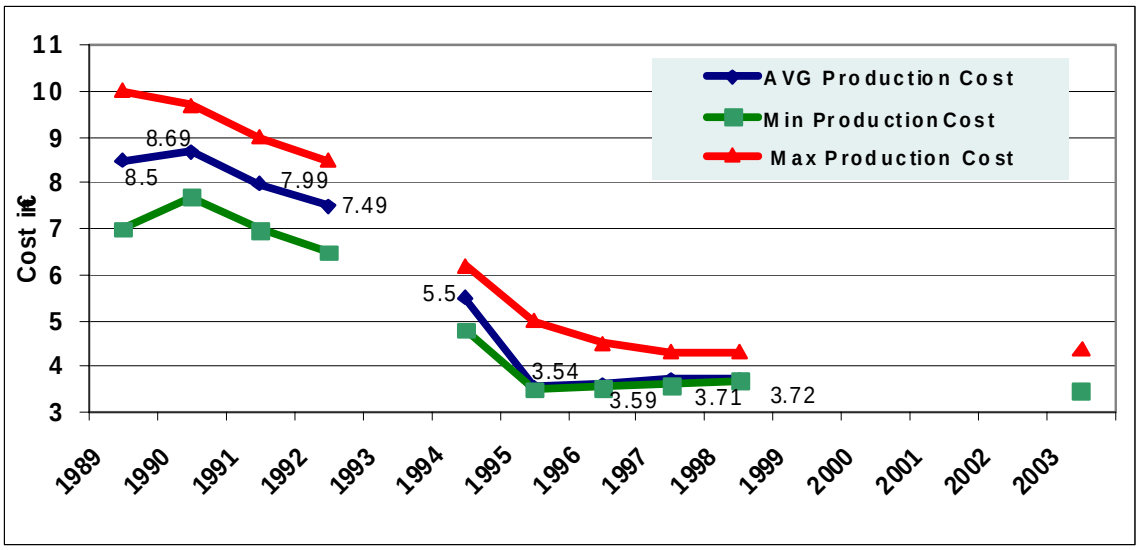


Figure 25 Evolution of Seabass and Seabream production cost.

Source: 1989-1994 data from Stephanis 1995;.1990-92 and 1995-1998 data from MacAlister Elliott & Partners Ltd, 12/1999; 2003 data based on research by Lamans SA

The three main costs are feed, fry and labour, which together comprise around 70% of costs. Maximum efficiencies in terms of feed, fry and labour use have already mostly been captured, and any further gains in these respects are likely to be realised only slowly. There are no major differences in these essential inputs between the main producers, with the exception of Turkey, which has significantly lower labour costs.

The greatest scope for reduction in production costs in the short term is likely to come from a reduction in overheads through the merging of smaller farms with larger operations, a trend that is clearly evident especially in Spain and Greece. However, given that indirect costs only account for around 15% of costs, the scope for reduction is not great. In practice it is likely that average industry production costs will move down toward €3.50/kg as rationalisation takes place.

In the longer term, there are likely to be gains through improved fry production, survival, growth, food conversion efficiency, selective breeding, and labour efficiency, as has already been the experience with other forms of intensive aquaculture such as salmonid farming.

3.5 Regulatory and structural context

Licensing of farms

In all countries, licensing procedures are difficult and time consuming, in some cases taking up to 5 years. Aquaculture is a relatively new industry, there is no legislation that deals specifically with it, and most jurisdictions take a cautious approach. Many different parties have to be consulted, and there is often conflict and competition with other users eg fisheries and tourism. In addition, there are increasingly strict environmental restrictions and the need in most cases for comprehensive environmental impact assessments (EIAs). Given that most licensing takes place at the local level, there are major issues with local authorities being influenced by fishermen, environmentalists, lobbyists for tourism and local politicians, all of whom generally prove to be more politically powerful than aquaculturists.

In Greece it is an acknowledged fact that most existing sites are exceeding their licensed capacity, and this matter needs to be resolved. One of the reasons for this is that once farms have been established, local opposition often increases, making it difficult for farms to gain an extension of capacity. Moves are however afoot to transfer licensing from the prefectural level to the regional level, which it is hoped will reduce the impact of local politics on the procedure. In addition, a law has been passed for Coastal Zone Management which would include aquaculture, although much still remains to be done to work out the details.

In Turkey, coastal zone master plans do not include aquaculture, legislation is complex, and it may take up to three years to get a permit. Increasingly, the only scope for expansion is on offshore sites away from the coast.

In Italy, it may take up to 5 years to obtain permission for an offshore cage farm. Areas with most potential include the islands to the west and south.

In Spain, licensing procedures were relatively straightforward in the early days of the industry, but a process of decentralisation to local communities has since made licensing more difficult, and increasing public awareness of aquaculture has resulted in further constraint. Areas still with scope for development include the southern Mediterranean coast and the Canaries.

In France, farms of over 20t capacity have to carry out a comprehensive EIA which may take up to 2 years. IFREMER, the government research body, carried out a survey of the aquaculture site potential of the French coast which was completed in 2001. It found that the potential was in fact still good, but is severely constrained by legal and political issues.

In Portugal, the areas with most potential for aquaculture are also environmentally protected, making any new development very difficult.

3.6 Economic context

3.6.1 EU funding support

The primary mechanism for financial support to the aquaculture sector is the Financial Instrument for Fisheries Guidance (FIFG), which is one of the European Community's structural funds. It has the dual aim of supporting the Common Fisheries Policy and addressing disparities in development between different regions. Funding is allocated through national multi-annual programmes, which reflect national priorities and involve additional national government contributions. The level of support given to individual projects also reflects their regional location with respect to overall social and economic development objectives (i.e. is highest for regions with Objective 1 status). Between 1995 and 1999, Euro 2.85 billion was allocated through FIFG, of which Euro 273.37 million was for aquaculture (211.9 million in Mediterranean countries). For the period 2000-2006, the total FIFG budget is Euro 3.7 billion.

Table 27: Summary of FIFG supported investment in marine aquaculture (1995-99)

Country	Structural fund interventions in aquaculture 1995-99 (Million Euros)
Austria	1.05
Belgium	2.26
Denmark	9.17
Germany	17.77
Greece	31.6
Spain	66.88
Finland	7.59
France	39.85
Ireland	13.91
Italy	54.9
Luxembourg	0.76
Netherlands	1.95
Portugal	18.67
UK	10.32

Note: Euro rates based on 1994 exchange rates

Table 28: Supported investment in sea bass and bream examples

Total investment France including Corsica	4 799 000 €
Total investment France excluding Corsica	3 720 000 €
Total investment Cyprus	6 840 000 €
Public fund contribution in Cyprus	2 736 000 €
Total funding in Greece, 1994-1996	84 302 343 €
Total funding in Greece 2000-2003	59 657 325 €
Total investment in Italy 2003	49 046 402 €
Public fund contribution in Italy 2003	22 396 438 €
Total investment in Spain 1994-2002	34 520 000 €
Public fund contribution in Spain 1994-2002	18 280 000 €

Aquaculture also benefits under the FIFG programme through support for generic marketing, and improvements to processing and hygiene facilities, including quality certification and product labelling. Between 1995 and 1999, Euro 84.13 million and 585.83 million respectively was allocated to these activities (covering the entire fisheries sector). In a wider context, aquaculture communities may also be helped through broader development programmes under the European Regional Development Fund (EFDF) and European Social Fund (ESF). Prior to 1999, some funding from the PESCA programme supported diversification from the fishing industry into aquaculture related activities.

The current programme is set out in Council Regulation 1263/99 and Council Regulation 2792/99. Proposals to modify the provisions for Aquaculture have been made by the Commission (COM(2003)658), and are expected to be finalized by May 2004. A major theme of the proposed changes is to reduce incentives for the development of additional production capacity, whilst providing further support for market development, improvements in environmental performance, and additional farm-based research. Specific support is also proposed for extensive fish farming, which might associate economic activity with conservation or development of wetlands.

Aquaculture is also supported through funding for applied research and technology development, e.g. through the European RTD Framework Programmes (Currently the 6th Framework Programme).

Table 29: Funding to Aquaculture and Fisheries under the RTD Framework programmes

Programe	Years	EC Funding
FP3 - FAR	1988-1992	Ecu 31.3 Million
FP4 - FAIR	1993-1997	Ecu 109.9 Million
FP5 – Quality of Life	1998-2002	

Unlike previous framework programmes, there is not a specific programme for aquaculture and fisheries in FP6, although some research is being funded under wider animal health, environmental, and food safety themes. Research funding is also available to the sector through the measures to support SMEs and indirectly through policy oriented research.

For the Canaries, the POSEICAN programme has proved important for the development of the aquaculture industry. This programme provides financial compensations to cover the additional costs associated with operating in remote regions, currently estimated by the European Commission at €1.3/kg.

Impact of community aid on the development of the sector to date

The FIFG programme has undoubtedly played a major role in the rapid development of the aquaculture industry over the past 20 years. For instance, in Greece, between1994-1996, 116.5 million euros were allocated for aquaculture related projects. At the end of the programming period, under Measure 3.1 (Aquaculture capacity increase) 162 investment projects had been financed with a total of €84.302.3432 (all species included). The latter funding, as far as Seabass and Seabream are concerned, increased the production capacity by 8,754 tonnes (4,341 tonnes for Seabass and 4,413 tonnes for Seabream), while it also financed an increase in fry production capacity by 16,3 million fingerlings. Moreover, under Measure 3.2, (Improvement without capacity increase) it financed the improvement (hygiene, safety, environmental) of 49 units with a total of €16.983.131.

For the programming period 2000-2006, about 120 million euros have been allocated for aquaculture related projects in Greece, accounting for almost 40% of the total funding available by the Operational Programme Fisheries 2000-2006. The Programme is in progress and, by the end of September 2003, under Measure 3.2 'Aquaculture' 133 projects, worth a total of €59,657,325 , had been selected and approved for financing. 59 of those projects, with a total budget of €32,036,207 - of which €14,416,293 was Public Expenditure- are related to production capacity increases. In particular, these projects are expected to increase the annual production by 7,077 tonnes of marine fish, by 768 tonnes of freshwater fish, by 1,456 tonnes of bivalve oysters and by a total of 31 million fingerlings. Moreover, 71 fish-farms (marine & fresh water) and 6 oyster-farms have been selected and approved for financing under the Action '*Modernization of existing units without increasing production capacity' with a total of* €12,429,503 (Public Expenditure), out of a total cost of €27,621,118

In Spain, between 1994 and 2002 about 75 sea marine aquaculture projects received public funding with a total (FIFG and national contributions) of €18.28 m. Total investment can be estimated at €34.52 m. The impact of this investment on production is uncertain, but across the sector, there was a rise of around 7000 tonnes. FIFG has similarly proved very important for the development of the industry in Southern Italy, in Portugal.

Future requirements for community aid

Perceptions of the future requirements for community aid appear to differ between countries. The Spanish industry would like to see continued support for production capacity development, as they feel the industry is still too small to take proper advantage of economies of scale, and are not yet fulfilling the market demand for sea bass and sea bream in Spain. Species and product diversification is seen as desirable in the long-term, as well as improvements in marketing and through the distribution chain. However, the industry has not yet reached a size or organization pattern that would allow for these types of investment.

In Greece, there is general recognition that production has grown ahead of markets, and the main priority for Community aid is considered to be market development.

In autumn 2002, in response to the price crisis, the EC invited member states to suspend all financing of projects which might entail a risk of creating surplus production capacity for seabass and seabream. The use of FIFG funds for further development of the industry is examined again in section 6.

3.6.2 Other economic factors

All EU member states have had access to EU structural funds throughout the development of the industry, supported to a greater or lesser degree by national governments (see section 3.6.1). In countries outside the EU, no such support has been available. In Turkey for example, no capital grants have been available since 1995 (prior to this 25% grants were available under an agricultural scheme). A scheme was introduced in 2003 offering producers a premium of €0.09/kg of fish produced (only 2.5% of current prices, compared with VAT at 8%) based on licensed capacity and invoiced sales, thought to be partly to encourage full declaration of production and reduce black market sales amongst smaller producers. High inflation in Turkey has also meant high interest rates, which prior to 2001 attracted a 50% subsidy for aquaculture producers. This practice was banned in 2001, and now the only incentive is a one year repayment moratorium on agricultural loans. In large part, however, the industry in Turkey has not been subsidised, in stark contrast to producers within the EU. In addition, there are no stock market listed companies in Turkey, so that most of the capital invested in the business has come from producers themselves.

Two principal economic factors stand out as having had an impact on the industry in the period 1998 to 2002, the introduction of the Euro, and the internal economic crisis in Turkey.

The introduction of the Euro is reported to have reduced consumer spending power in several countries, including Spain and Italy. Market sources in these countries reported a significant reduction in demand especially in the catering sector, as people eating out in restaurants, a common practice at lunchtime in Spain and Italy, cut back on expenditure. This may have been an important contributory factor to the price crisis in Europe.

In Turkey, a banking and economic crisis in 2001 and 2002 lead to major turmoil and restructuring of the industry. Small farms, many dependent on extended credit from fry and feed suppliers, were forced out of business. The strength of the Turkish Lira has a major influence on export activity: a strong Lira favours home sales, whilst a weak LIra favours exports. Thus when the Lira was devalued by nearly 100% in February 2001, exports increased significantly, and again in 2002, as producers sought to earn foreign currency. By 2003, the economy had stabilised again and home consumption and sales were strong. The increase in exports in 2001-2002 may thus have been a contributory factor to the European price crisis.

The financing of the industry through the provision of extended credit by fry and feed suppliers is a major feature of the industry, especially amongst smaller producers in Greece and Turkey. The problem is believed to be especially acute in Greece, and has resulted in many smaller farms unable to pay their bills being absorbed by their creditors.

3.7 Projections of production potential

3.7.1 Likely future development of the industry

The future development of the industry will be dependent on many factors, chief of which are the following:

- site availability
- cost of production
- economic stability
- market demand

How and where the industry develops will be very much dependent on how these key factors apply in each of the producer countries, and how weaknesses and threats can be overcome and strengths and opportunities exploited by the different players. A SWOT analysis of the key producers is presented in Table 30.

The points presented in the table are the main ones applying to the countries in question. In addition, there are points common to all countries, for example:

Strengths

- well established and increasingly professional workforce
- increasingly well developed level of know-how
- strong demand for fish products
- strong support from EU (except Turkey and other third countries)

Weaknesses

- difficulty in obtaining or modifying licences
- lack of cooperation amongst producers (nationally and internationally)
- lack of quality schemes and product promotion
- lack of product differentiation and development
- lack of national strategic plans for aquaculture
- lack of cooperation between government and industry on R&D
- not much scope in short term to reduce production costs

Opportunities

- scope for industry rationalisation
- development of more efficient production systems
- scope to develop consumption in all markets
- development of quality schemes and branding
- development of new product forms
- better promotion
- more efficient distribution systems as industry grows
- scope for better industry administration

Threats

- growing public awareness of the potentially negative aspects of aquaculture
- unregulated supply causing imbalance in the market

With regard to individual countries:

Greece has probably the best site availability of any producer providing site licensing and coastal zone management issues can be overcome; certainly the Greek government is taking steps to promote legislation that will make planning easier in the future. It has relatively low production costs, there are few small companies left ie producing less than 100t p.a., and vertical integration amongst bigger companies. Providing issues of unregulated production and sales can be dealt with, the industry here undoubtedly has scope to develop further. Its main weakness is its dependence on export markets. The main importers such as Italy, Spain and France have their own industries and their consumers tend to favour the home produced product over Greek imports. This is in large part due to the undisciplined supply, lack of quality schemes, branding and promotion by Greek producers.

Turkey also has good site availability but above all has the lowest production costs, mainly due to low cost of labour. It has a strong home market and is presently not too dependent on exports. The instability of the economy and major planned increases in production by some companies are potential threats.

Italy has the largest market in Europe for bass and bream. Although its production costs are higher than elsewhere due to a predominance of small land based farms, the local product is preferred over imports in the retail trade and attracts a better price. There is scope to increase consumption through product development and quality schemes. There is a possibility for further site development, but even if licensing restrictions could be overcome, this would have to be based on offshore cage systems which are still relatively costly to install and operate compared to the sheltered inshore sites found in Greece and Turkey.

Spain also has a strong home market, and a preference for local products. Sales and distribution is concentrated in the hands of 4 main companies, offering much better scope to control sales than in the past. There appears to be

good scope for increase in production through site development in the southern Mediterranean coast and in the Canaries. One of the main threats is increasing and unregulated imports from other countries, especially Greece.

Production potential in France is limited unless the political will to support aquaculture changes for the better. However, there is good demand for locally grown products many of which are branded and part of quality schemes.

Production potential in Portugal is very limited, due to colder Atlantic water temperatures and environmentally protected areas. Home demand is however strong and will be met mainly by imports.

Production in other countries eg Israel and north Africa has scope, but there are no sheltered sites, infrastructure may be poor in some areas, and they are distant from European markets. Cyprus and Malta have well-established industries, but limited scope for further production increases. EU membership would open up market opportunities especially for Malta, which presently faces a 15% tariff, but at present production there has declined in favour of tuna farming.

Table 30. SWOT analysis of production and market potential in main producing countries

	Greece	Turkey	Italy	Spain	France
Strengths	• Site availability • Low and decreasing production costs • High production capacity	• Site availability • Lowest production costs • High production capacity • Strong home market	• Well developed home market with preference for local products	• Strong home market with preference for local products • Scope for warmer water production (Canaries)	• Positive image of home farmed product • Well developed quality schemes • Good local market
Weaknesses	• Unregulated production and trade • Inefficient marketing • Lack of strategic sector plan • Reliance on exports	• Distance from export markets • Lack of subsidy compared with EU producers • Predominance of smaller producers	• High costs of production • Predominance of small and medium land based producers • Lack of sheltered cage sites	• Lack of sheltered sites	• Particularly difficulty to obtain licences • Higher production cost of land based units
Opportunities	• Development of quality schemes • Improved promotion • Improved production planning	• EU membership • Development of internal market	• Development of internal market through added value products and quality schemes	• Improvement of local distribution and marketing • Improved production planning	• New sites if political will to support eg in Corsica • Growing demand for quality certified, branded and value added products
Threats	• Oversupply of markets and lack of promotion depressing prices • Competition from Turkey as low cost producer	• Economic instability • Undisciplined growth in production	• Increasing and undisciplined imports	• Undisciplined marketing of own fish and imports • Low cost of imports	• Low cost imports

3.7.2 Forecast production

Introduction

Each of the partners for this study were asked to make a forecast of production for the period 2002-2008, taking into account their knowledge of their industries and factors that might influence future development. Two forecasts were requested, a baseline scenario taking a more cautious approach, and an optimistic scenario assuming the most favourable conditions for development. Further details of how the forecasts were arrived at can be found in the country reports. Where partners were not able to make forecasts, we have used our own judgement in estimating production.

Baseline scenario

The results of the baseline scenario are presented in Table 31 and Figure 26.

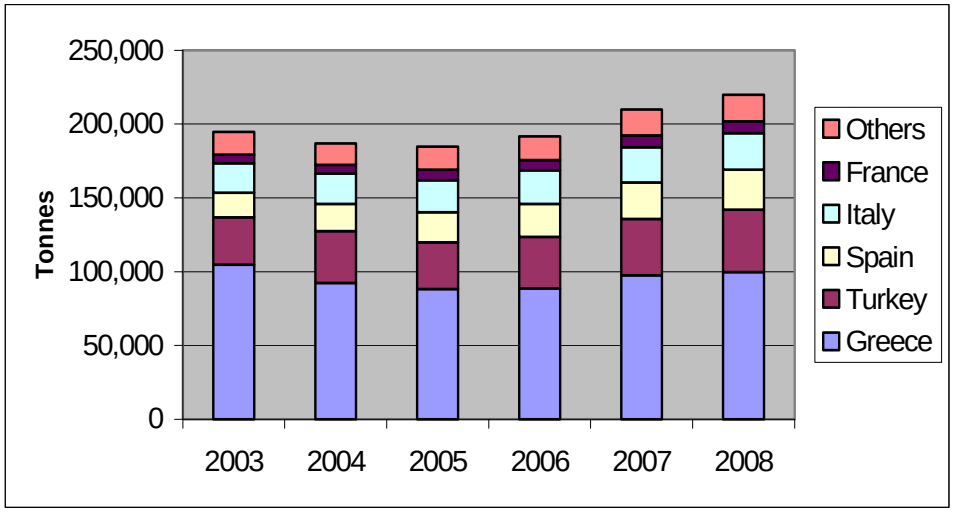


Figure 26. Forecast production of seabass and seabream 2003-2008 by main producers (baseline scenario)

Table 31: Forecast production for the period 2003-2008 (baseline scenario).

Seabass						
(tonnes)	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***
Greece	45,065	39,648	37,950	38,145	41,920	42,926
Turkey	18,000	19,800	17,800	19,600	21,500	23,700
Italy	10,000	10,100	10,500	10,600	11,000	11,100
Spain	4,900	5,400	5,900	6,500	7,200	7,900
France	4,020	4,020	4,690	4,690	5,360	5,360
Croatia	2,010	1,675	2,010	2,010	2,345	2,680
Portugal	1,300	1,200	1,350	1,300	1,400	1,350
Tunisia	650	650	650	650	650	650
Cyprus	500	520	550	570	600	600
Malta	300	300	300	300	300	300
Egypt	130	130	130	163	216	216
Morocco	200	200	200	200	200	200
Total	**87,075**	**83,643**	**82,030**	**84,728**	**92,691**	**96,982**
Seabream						
(tonnes)	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***
Greece	59,738	52,556	50,305	50,564	55,569	56,902
Spain	11,900	13,100	14,400	15,800	17,400	19,200
Turkey	14,000	15,400	13,900	15,300	16,800	18,500
Italy	9,800	10,500	11,300	12,100	12,900	13,700
France	1,980	1,980	2,310	2,310	2,640	2,640
Cyprus	1,700	1,780	2,000	2,400	2,500	2,600
Israel	2,500	2,500	2,500	2,500	2,500	2,500
Portugal	2,500	2,300	2,600	2,400	2,700	2,500
Egypt	982	982	982	1,228	1,618	1,618
Croatia	990	825	990	990	1,155	1,320
Malta	750	750	750	750	750	750
Tunisia	350	350	350	350	350	350
Morocco	300	300	300	300	300	300
Total	**107,490**	**103,323**	**102,687**	**106,992**	**117,182**	**122,880**

Both species						
(tonnes)	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***
Greece	104,803	92,204	88,255	88,709	97,489	99,828
Turkey	32,000	35,200	31,700	34,900	38,300	42,200
Spain	16,800	18,500	20,300	22,300	24,600	27,100
Italy	19,800	20,600	21,800	22,700	23,900	24,800
France	6,000	6,000	7,000	7,000	8,000	8,000
Croatia	3,000	2,500	3,000	3,000	3,500	4,000
Portugal	3,800	3,500	3,950	3,700	4,100	3,850
Cyprus	2,200	2,300	2,550	2,970	3,100	3,200
Israel	2,500	2,500	2,500	2,500	2,500	2,500
Egypt	1,112	1,112	1,112	1,391	1,834	1,834
Malta	1,050	1,050	1,050	1,050	1,050	1,050
Tunisia	1,000	1,000	1,000	1,000	1,000	1,000
Morocco	500	500	500	500	500	500
Total	**194,565**	**186,966**	**184,717**	**191,720**	**209,873**	**219,862**

Table 32: Forecast change in % share of production by different countries 2002-2008 (baseline scenario)

	% share of production 2002	Forecast % share of production 2008
Greece	57%	45%
Turkey	14%	19%
Italy	10%	11%
Spain	8%	12%
France	3%	4%
Portugal	2%	2%
Others	6%	7%
Total	100%	100%

Production in 2003 is estimated to have been 195,000t, a slight increase from 181,000t in 2002. From a peak in 2003 however, production is expected to fall to 185,000t in 2005 before increasing again to nearly 220,000t in 2008.

The most obvious potential development over the next 5 years is the levelling out of production in Greece, whilst production in Turkey, Spain, and Italy especially is forecast to increase. Greece is forecast to reduce its share of production from 57% in 2002 to 45% in 2008, whilst Turkey increases share from 14% to 19% and Spain from 8% to 12%. Changes in other countries are less significant (see Table 32).

The reason for the levelling off in Greece is attributed to the failure of a number of high profile operations and more are expected to follow. Many smaller companies are having to sell below cost of production and this has been the case for some time. Apart from companies that cease production and exit the industry, others are expected to merge and adjust their production more in accordance with market requirements.

The declining financial fortunes of Greek producers are clearly illustrated in Table 33 and Figure 27.

Table 33: Financial returns for Greek companies for the period 1996 to 2002

	1996	1997	1998	1999	2000	2001	2002
	Return on equity						
Large companies	23%	22%	11%	6%	4%	3%	2%
Medium companies	7%	7%	8%	13%	9%	10%	6%
Small companies	12%	13%	12%	9%	7%	3%	-0.1%
	Net profit margin before taxes						
Large companies	22%	20%	13%	11%	12%	9%	4%
Medium companies	5%	4%	6%	10%	6%	7%	5%
Small companies	6%	5%	8%	8%	5%	2%	-0.1%

Source: ICAP 2002, 2003; Lamans SA

The figures are based on a study carried out by ICAP and further analysed by Lamans. The large companies are the 4 largest quoted on the Athens Stock Exchange with turnover of €16-55 million in 2002. The medium companies consist of 7 with a turnover of €4-18 million. The small companies consist of 8 with a turnover of €0.8-3.2 million, with production estimated to be in the range of 200 to 800t p.a.

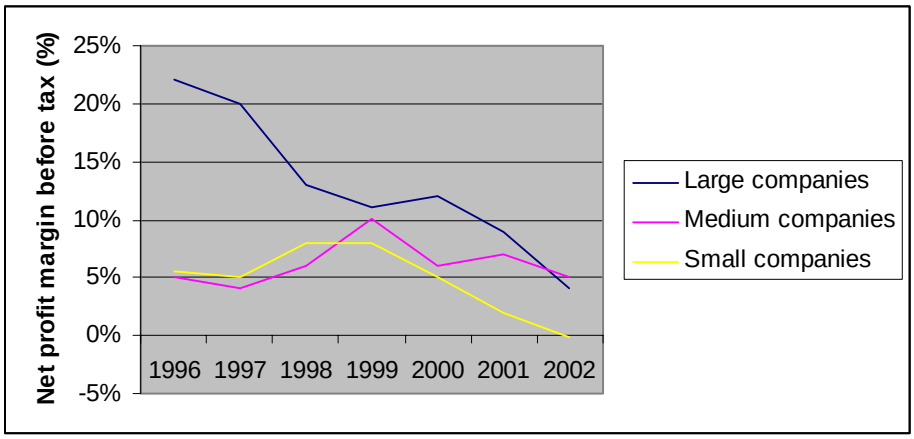


Figure 27. Profit margins of Greek producers

Source: ICAP 2002, 2003; Lamans SA

Whilst all companies have faced declining return on equity and profit margins, it is the "smallest" producers ie with production less than 1000t p.a. that have been hardest hit, with negative profit margins recorded in 2002. Given the further decline in prices in autumn 2003, and the high level of debt especially amongst small producers, it is likely that there will be further company failures. Around 40% of Greek production in 2002 was in the hands of companies with production of less than 1000t p.a., and it is this sector of the industry where significant further rationalisation could occur.

Optimistic scenario

The results of the optimistic scenario are presented in Table 34 and Figure 28.

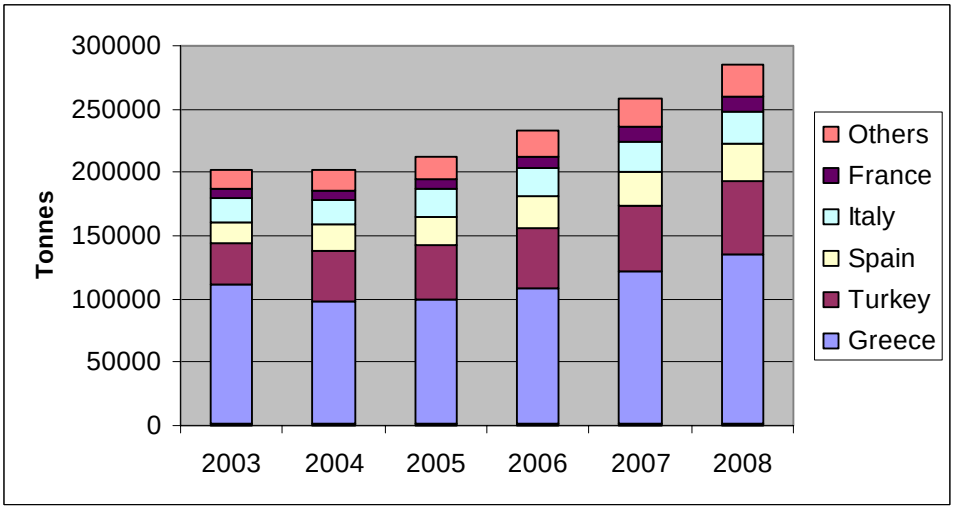


Figure 28. Forecast production of seabass and seabream 2003-2008 by main producers (optimistic scenario)

Table 34: Forecast production for the period 2003-2008 (optimistic scenario).

Seabass (tonnes)	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Greece	47,229	41,551	41,725	45,869	51,317	57,449
Turkey	18,000	22,500	24,750	27,200	30,000	33,000
Italy	10,000	10,100	10,500	10,600	11,000	11,100
Spain	4,900	5,929	6,522	7,174	7,891	8,618
France	4,020	4,690	5,360	6,365	7,370	8,040
Croatia	2,345	2,010	2,345	3,015	4,020	4,690
Portugal	1,300	1,400	1,450	1,500	1,550	1,600
Tunisia	650	700	750	800	900	1,000
Cyprus	550	600	650	650	700	750
Malta	300	300	300	350	375	400
Egypt	130	150	170	200	250	302
Morocco	200	200	200	250	250	300
Total	**89,624**	**90,130**	**94,722**	**103,973**	**115,623**	**127,249**
Seabream (tonnes)	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Greece	62,606	55,080	55,311	60,804	68,026	76,153
Spain	11,900	14,399	15,839	17,423	19,165	21,082
Turkey	14,000	16,800	18,500	20,300	22,300	24,500
Italy	9,800	10,500	11,300	12,100	12,900	13,700
France	1,980	2,310	2,640	3,135	3,630	3,960
Cyprus	1,800	1,900	2,200	2,500	2,800	3,000
Israel	2,500	2,500	2,500	2,500	2,500	2,500
Portugal	2,500	2,600	2,700	3,700	3,800	3,800
Egypt	982	1,100	1,400	1,700	2,000	2,353
Croatia	1,155	990	1,155	1,485	1,980	2,310
Malta	750	800	1,000	1,200	1,300	1,500
Tunisia	350	375	400	425	475	500
Morocco	300	300	350	400	450	500
Total	**110,623**	**109,654**	**115,295**	**127,672**	**141,326**	**155,858**

Both species (tonnes)	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Greece	109,835	96,631	97,036	106,673	119,343	133,602
Turkey	32,000	39,300	43,250	47,500	52,300	57,500
Spain	16,800	20,328	22,361	24,597	27,056	29,700
Italy	19,800	20,600	21,800	22,700	23,900	24,800
France	6,000	7,000	8,000	9,500	11,000	12,000
Croatia	3,500	3,000	3,500	4,500	6,000	7,000
Portugal	3,800	4,000	4,150	5,200	5,350	5,400
Cyprus	2,350	2,500	2,850	3,150	3,500	3,750
Israel	2,500	2,500	2,500	2,500	2,500	2,500
Egypt	1,112	1,250	1,570	1,900	2,250	2,655
Malta	1,050	1,100	1,300	1,550	1,675	1,900
Tunisia	1,000	1,075	1,150	1,225	1,375	1,500
Morocco	500	500	550	650	700	800
Total	**200,247**	**199,784**	**210,017**	**231,645**	**256,949**	**283,107**

In Greece in the short term, production is still expected to fall as industry rationalisation occurs. However, should market prices and profitability recover, it is possible that production could reach around 133,000t by 2008. Given existing and anticipated hatchery production capacity in Greece of around 400 million fry plus imports, together with good availability of further sites for ongrowing, this level of production is potentially achievable.

In Turkey and Spain, production has the potential to nearly double by 2008, assuming strong domestic and export demand. Both countries have good hatchery capacity and relatively good site availability. In France, production might also double, assuming strong political support from the national authorities in overcoming site availability constraints. Site availability in Italy is more limited, and no greater production is expected under the optimistic scenario compared with the baseline

Most other producers have some scope for increasing production, but because current production is relatively low and site availability is generally limited, in overall terms such additional production would not be great.

It should be emphasised that both the production scenarios outlined above, but in particular the optimistic scenario, are heavily dependent on effective market development to stimulate demand, including product development, quality assurance, improved distribution and promotion.

4 The market for seabass and seabream

4.1 A contextual overview of the market for fishery products

Most countries have positive attitudes towards seafood but commonly prefer fresh to frozen produce; other product forms can add yet further complications such as the inclusion of preferences for dried and salted product. Country consumption statistics vary greatly, depending on the information sources, product yields and calculation methods used. Collation difficulties, lack of incentives to report accurate trade statistics and indeed positive incentives to do otherwise have conspired to create discrepancies between actual and reported data. Small volumes may be left out of reporting and the situation is further confused by the categories used to identify species. This is commonly the case with comparatively new species in markets where, by definition, the initial launch years at least will tend only to exclude the small volumes being traded. In some cases consequently sea bass and seabream are categorised as "other fish". It is clear from the reports evaluating markets and consumer trends that some difficulties ensue from this dearth of accurate information.

Whilst there remains a preference for fresh whole fish there is some evidence of a slowly declining trend within the increasing demand for the seafood and aquaculture supplementing total requirements (e.g. Greece and Italy, Portugal). This is particularly demonstrated in the Greek market with an overall increase in production from 3% in 1989 to 35% in 1998. Per capita consumption of fishery products in Greece for 1998 was 26.5 kg. Most consumers prefer "home-produced" products rather than imported along with some evidence of quality control certification. In Spain 2001, per capita consumption of fish products was estimated to have been 35.3kg with fresh fish accounting for 46% of total fish related products.

Nordic countries such as Denmark, Sweden and Finland are marginal markets for seabass and seabream. Supply to these markets is limited to imports from Central and Southern Europe as there are no natural catches or farmed fish. There is clearly an opportunity to develop import and export markets in Denmark, Sweden and Finland. The Danish consumption pattern is similar to Swedish and includes breaded frozen fillets and marinated herring. Germans spend on average 60euros per head on seafood per year and the seafood sector is worth 4bn Euro. Between 2000- 2001 84.4% of Germanys' 82 million population said they purchased seafood with 70% of all seafood being consumed in restaurants.

Common across most countries is the fairly low yearly consumption of fish compared with meat. Consumers tend to be price conscious and the relative price of fish and fish products have increased. Seabass and bream are viewed as high priced specialty fish.

4.2 International trade in seabass and seabream

Italy has always had the best developed market for seabass and seabream and until recently always offered the highest prices. From the earliest days of the industry, therefore, producers in other countries aimed to export their product to Italy. This was especially the case for species for which there was little demand on the home market, for example seabass in Greece and Turkey.

However, as the industry grew throughout the 1990s, the Italian market came under increasing pressure. This prompted producers in Greece to look elsewhere in Europe for markets, and now Spain and Portugal are as important as Italy for Greek exports. Other smaller but important markets for Greek producers are France, the UK, and Switzerland.

All of the partners for this study have gathered trade data for their countries from official statistical sources, and the results can be found in the country reports. However, there are major inconsistencies in import and export data which make analysis of trading volumes difficult. Particular problems arise in the recording of intra EU trade, which is often lax or absent altogether.

Table 35. Production, trade and apparent consumption of seabass and seabream in 2002, based on official trade statistics

		Seabass					Seabream					Both species		All fish	
	Population ('000)	Production (tonnes)	Imports (tonnes)	Exports (tonnes)	Apparent consumption (tonnes)	Consumption per capita (kg)	Production (tonnes)	Imports (tonnes)	Exports (tonnes)	Apparent consumption (tonnes)	Consumption per capita (kg)	Apparent consumption (tonnes)	Consumption per capita (kg)	All fish cons. per capita (kg)	Bass & bream cons. as %
Italy	57,600	12,335	13,955	832	25,458	0.44	10,070	11,810	1,307	20,573	0.36	46,031	0.80	24.6	3.2%
Spain	40,000	3,674	9,466	958	12,182	0.30	12,366	9,990	3,015	19,341	0.48	31,523	0.79	44.6	1.8%
Greece	10,600	44,739	450	15,554	29,635	2.80	59,083	900	26,508	33,475	3.16	63,110	5.95	25	23.8%
Turkey	67,600	15,539	0	5,430	10,109	0.15	12,681	0	1,183	11,498	0.17	21,607	0.32	8	4.0%
France	60,000	6,558	2,674	3,044	6,188	0.10	1,533	2,909	706	3,736	0.06	9,924	0.17	31.2	0.5%
Egypt	69,000	2,845			2,845	0.04	3,462			3,462	0.05	6,307	0.09		
Portugal	10,000	1,698	707	0	2,405	0.24	2,685	2,070	0	4,755	0.48	7,160	0.72	76.2	0.9%
Israel	6,700	150			150	0.02	2,500			2,500	0.37	2,650	0.40		
UK	60,000	457	2,402	99	2,760	0.05		555	2	553	0.01	3,313	0.06	21.6	0.3%
Croatia	4,600	1,605	2	736	871	0.19	900	4	174	730	0.16	1,600	0.35	8	4.3%
Germany	83,000		715		715	0.01		858		858	0.01	1,573	0.02	13.3	0.1%
Cyprus	784	425	0	161	264	0.34	1,305	0	213	1,092	1.39	1,356	1.73	18	9.6%
Netherlands	16,000		1,155	822	333	0.02		357	56	301	0.02	634	0.04	20.6	0.2%
Tunisia	9,600	648		240	408	0.04	352		121	231	0.02	639	0.07		
Belgium	10,200		420	188	232	0.02		191	43	148	0.01	380	0.04	21.6	0.2%
Austria	8,100		150		150	0.02		150		150	0.02	300	0.04	13.3	0.3%
Morroco	30,400	200		100	100	0.00	300		150	150	0.00	250	0.01		
Malta	390	300	0	270	30	0.08	750	0	675	75	0.19	105	0.27		
Ireland	3,800		62		62	0.02		2		2	0.00	64	0.02	16	0.1%
Denmark	5,300		13	30	-17	0.00		7	3	4	0.00	-13	0.00	26.5	0.0%
Sweden	8,900		8	0	8	0.00		2	0	2	0.00	10	0.00	30.9	0.0%
Finland	5,200		2	1	1	0.00		2	0	2	0.00	3	0.00	32.1	0.0%
Total	567,774	91,173	32,181	28,465	94,889	0.17	107,987	29,807	34,156	103,638	0.18	198,526	0.35		

Source: country reports, FAO

Notes

1 Production is from both capture fisheries and aquaculture

2 Official trade statistics for Greece based on previous years figures and trend data

A compilation of production, trade and apparent consumption for all countries producing and consuming seabass and seabream in 2002 is given in Table 35. At first sight, a balanced picture emerges, with production more or less equaling apparent consumption. The overall trade patterns are also clear, with Greece and Turkey the main exporters, and Italy and Spain the main importers. However, when looking at the apparent consumption per capita for seabass and seabream, Greece is shown as having a figure of nearly 6kg/capita, whereas Italy and Spain are shown as having less than 1kg. This in itself points to a major discrepancy in the data.

In order to try and establish a more valid picture of trade and consumption, a model has been developed to estimate the true fate of Greek production. This model is based on data from a respected Greek trader in seabass and seabream who has been active in the market for many years.

Table 36 gives a comparison of the official Greek export statistics for 2001 (the last year for which official data is available) with estimated actual volumes. It is estimated that actual exports are at least twice the officially recorded level.

Table 36. Comparison of recorded exports with estimated actual exports from Greece in 2001

	Seabass		Seabream		Total	
	Recorded exports (tonnes)	Estimated actual exports (tonnes)	Recorded exports (tonnes)	Estimated actual exports (tonnes)	Recorded exports (tonnes)	Estimated actual exports (tonnes)
Italy	6,100	15,784	13,100	10,523	19,200	26,306
Spain	3,300	7,366	5,700	13,679	9,000	21,045
Portugal	800	1,841	2,200	3,420	3,000	5,261
UK	200	1500	100	300	300	1,800
France	600	2060	700	2116	1,300	4,176
Switzerland	2,100			2000	2,100	2,000
Other	217	5,209	479	4,353	696	9,562
Total	13,317	33,760	22,279	36,391	35,596	70,151

Source: NSSG, Greek industry

Notes
"Other" includes Germany, Austria, USA, N Europe
Recorded exports are from NSSG

The same model has been used to estimate the fate of Greek production in 2002 (see Table 37).

Table 37. The estimated fate of Greek production in 2002

	Seabass	Seabream	Total	%
Production	44,439	58,907	103,346	
Greece	4,651	16,018	20,669	20%
Italy	18,602	12,402	31,004	30%
Spain	8,681	16,122	24,803	24%
Portugal	2,170	4,030	6,201	6%
Others	10,335	10,335	20,669	20%
Total	44,439	58,907	103,346	100%
Exports	39,788	42,889	82,677	

Source: Greek industry

Using the data from Table 37, Table 35 has been modified to reflect what is believed to be a more realistic picture of trading volumes and apparent consumption in 2002. The results are shown in Table 38.

The main trade flows are as follows:

Seabass

- Italy is the largest market for seabass, with around 75% of demand being met by imports, mainly from Greece and Turkey.
- Spain is the second largest market for seabass, with around 77% being met by imports, mainly from Greece
- Other significant importers are Portugal, France, the UK and Netherlands, supplied by Greece and Turkey
- France is also a significant exporter of seabass, predominantly larger fish from the capture fishery, and partly of farmed fish to the UK

Seabream

- Spain and Italy are the main markets for seabream, roughly equivalent in size and both relying on imports from Greece to meet demand (imports account for around 60% of demand)
- Portugal is third in importance as an importer, taking around a third of its supply from Spain and two thirds from Greece
- 77% of demand in France is met by imports, mainly from Greece.

Trends in imports and exports over the period 1998-2002

Looking at official import and export data for the period 1998-2002, the following trends can be seen:

- Greece: exports of bass and bream increased by 400%
- Turkey: very little bream exported, bass exports variable depending on home economy
- Spain: Imports of bass and bream increased equally by 1000%, more rapidly than in any other country
- Italy: imports of bass and bream increased equally by 100%
- France: imports of bass increased by 500%, bream by 300%
- Portugal: imports of bass and bream increased by 400%

4.3 Consumption of seabass and seabream

The main markets for seabass are shown in Figure 29. Italy was by far the largest market at 42,500t in 2002, a 46% overall share. Spain and Turkey are next in importance at 13% and 11% of the market respectively. Turkey however is self-sufficient and is a net exporter of bass, whilst Spain as with Italy depends on imports.

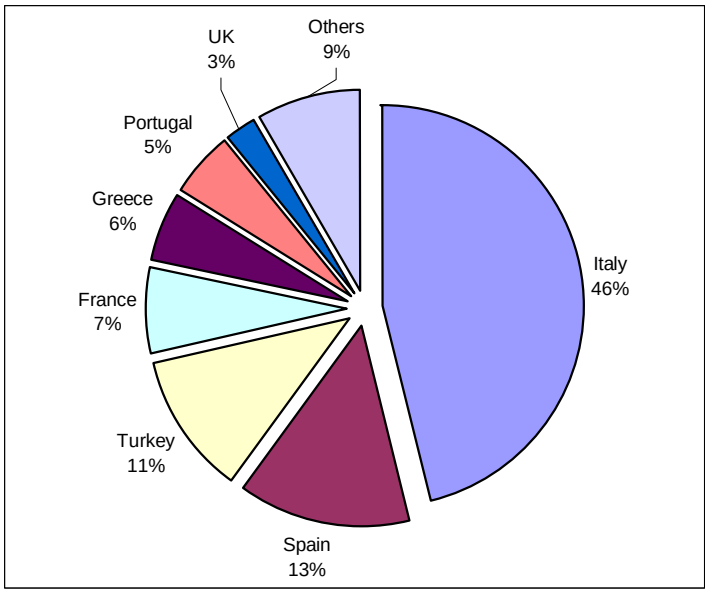


Figure 29: Main markets for seabass in 2002

The main markets for seabream are shown in Figure 30. In this case Spain (25% share) and Italy (22% share) are jointly the largest markets, with Greece (16%) and Turkey (11%) thereafter.

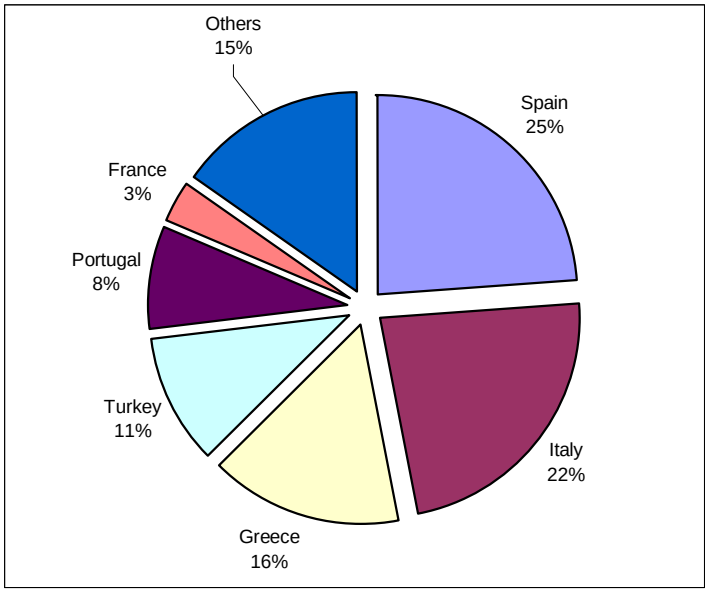


Figure 30. Main markets for seabream in 2002

Amongst the main producer/consumer countries, per capita consumption of seabass ranges from 0.1kg in France to 0.7kg in Italy. For seabream the range is from 0.06kg in France to 1.6kg in Greece (see Table 38).

Table 38. Production, trade and apparent consumption of seabass and seabream in 2002, based on estimated actual trade

		Seabass					Seabream					Both species		All fish	
	Population ('000)	Production (tonnes)	Imports (tonnes)	Exports (tonnes)	Apparent consumption (tonnes)	Consumption per capita (kg)	Production (tonnes)	Imports (tonnes)	Exports (tonnes)	Apparent consumption (tonnes)	Consumption per capita (kg)	Apparent consumption (tonnes)	Consumption per capita (kg)	All fish cons. per capita (kg)	Bass & bream cons. as %
Italy	57,600	12,335	31,000	832	42,503	0.74	10,070	15,122	1,307	23,885	0.41	66,388	1.15	24.6	4.7%
Spain	40,000	3,674	9,466	958	12,182	0.30	12,366	17,151	3,015	26,502	0.66	38,684	0.97	44.6	2.2%
Greece	10,600	44,739	450	39,971	5,218	0.49	59,083	900	43,086	16,897	1.59	22,114	2.09	25.0	8.3%
Turkey	67,600	15,539	0	5,430	10,109	0.15	12,681	0	1,183	11,498	0.17	21,607	0.32	8.0	4.0%
Portugal	10,000	1,698	2,877	0	4,575	0.46	2,685	6,100	0	8,785	0.88	13,360	1.34	76.2	1.8%
France	60,000	6,558	2,674	3,044	6,188	0.10	1,533	2,909	706	3,736	0.06	9,924	0.17	31.2	0.5%
UK	60,000	457	2,402	99	2,760	0.05	0	555	2	553	0.01	3,313	0.06	21.6	0.3%
Others	261,974	6,808	4,013	2,548	8,273	0.03	11,180	7,997	1,435	17,742	0.07	26,015	0.10		
Total	567,774	91,808	52,882	52,882	91,808	0.16	109,598	50,734	50,734	109,598	0.19	201,405	0.35		

Notes

1 Official statistics have been modified using inputs from Table 37 as follows:
2 Italian imports for bass assume 60% is from Greece (% from official statistics in 2002)
3 Italian imports for bream assume 82% is from Greece (% from official statistics in 2002)
4 Spanish imports for bass assume 90% is from Greece (% from official statistics in 2002)
5 Spanish imports for bream assume 94% is from Greece (% from official statistics in 2002)
6 Portuguese imports for bass assume 707t from Spain (official statistics in 2002) and balance from Greece (Table 37)
7 Portuguese imports for bream assume 2070t from Spain (official statistics in 2002) and balance from Greece (Table 37)
8 "Others" has been adjusted to balance production and consumption

For consumption of both species, Greece has the highest at 2.09kg, followed by Portugal at 1.34kg and Italy at 1.15kg. Whilst at first sight the per capita consumption in Greece seems surprisingly high, it has been corroborated by other sources, notably the 2003 ICAP report in Greece (see country report).

As a proportion of overall fish consumption, Greece is highest at 8.3% in 2002, followed by Italy at 4.7% and Turkey at 4%.

Trends in consumption for the period 1998-2002
The main trends in consumption over the period 1998-2002 are given in Table 39.

Table 39. Trends in consumption 1998-2002

		Consumption		Average annual growth ('98-'02)
		1998	2002	
Italy	bass	27,584	42,503	11.4%
	bream	23,783	23,885	0.0%
	total/avg.	51,367	66,388	6.6%
Spain	bass	2,252	12,182	52.0%
	bream	5,385	26,502	49.0%
	total/avg.	7,637	38,684	50.0%
Greece	bass	5,383	5,218	0.0%
	bream	15,885	16,897	1.5%
	total/avg.	21,268	22,114	1.0%
Turkey	bass	11,821	10,109	0.0%
	bream	11,416	11,498	0.0%
	total/avg.	23,237	21,607	-2.0%
Portugal	bass	1,120	4,575	42.0%
	bream	1,854	8,785	47.5%
	total/avg.	2,974	13,360	46.0%
France	bass	4,085	6,188	11.0%
	bream	1,770	3,736	20.5%
	total/avg.	5,855	9,924	14.0%
UK	bass	1,060	2,760	27.0%
	bream	109	553	50.0%
	total/avg.	1,169	3,313	30.0%
Others	bass	4706	8273	15.0%
	bream	8023	17743	23.5%
	total/avg.	12,729	26,016	20.0%
Total	bass	58,011	91,808	12.0%
	bream	68,225	109,599	12.8%
	total/avg.	126,236	201,406	12.5%

Assumptions
Production includes aquaculture and capture fishery
Capture fishery production 17,300t and 20,000t for 1998 and 2002 respectively
Consumption in 1998: official trade statistics used but amended as follows: Greek exports 80% of bass, 53% of bream (source FGM); 95% of Greek exports to Italy (source: NSSG)
Consumption in 2002: assumptions as per Tables 37 and 38

Consumption of both species in the relatively mature market of Italy has risen by only 30% over the period (6.6% annually), with growth in demand apparently being mainly for bass.

Consumption in France has also grown relatively modestly by 70% (14% annually), with higher growth in demand for bream than for bass.

In contrast, consumption in the Iberian peninsula countries of Spain and Portugal has risen very rapidly, by 400% and 350% respectively (50 and 46% annually).

Consumption in N European countries such as the UK and Germany has also risen substantially, although is still at a relatively low level. In Greece and Turkey consumption appears to have stayed relatively constant over the period, with Greece in particular already having a high per capita consumption.

Despite considerable growth the market for both seabass and seabream remains small compared to consumption of fresh salmon and fresh cod. For example, the market for seabass in Belgium represents 0.1% and seabream represents 0.07% of total domestic seafood consumption. In general, the economic crisis between 2001 and 2002 had an adverse effect on consumption patterns in all countries.

Seabass and Seabream is perceived as an up market product often consumed by older and retired people (see France and Germany). For example, in France 80% is purchased by consumers over 50 years old and over 60% is purchased by retired people. This reinforces the image of seabass and seabream as a luxury item that requires time and skill to be properly prepared. Difficulty in preparation is a consistent negative factor influencing consumption in many countries (see Greece, Italy).

Geographical market preferences can be identified within countries. For example seabass consumption is moderate in Western regions of France and Paris and seabream consumption is concentrated along the Mediterranean and the Western coast. In Northern Italy, the typical consumer is concerned with convenience and value added fish products whereas in the South whole, fresh seafood is preferred.

The prospects for further increases in consumption are examined in section 4.5.3.

4.4 Market characteristics

4.4.1 General characteristics

Although each country's marketplace has its own particular idiosyncrasies, some generic characteristics can be identified. The market is broadly segmented in two principal areas: catering which embraces profit and cost sectors providing for consumption away from he household and the retail sector from which purchases are made for preparation and consumption within the household. Multiple retailer chains or supermarkets increasingly dominate the retail market, with the market share of specialist fishmongers and street markets decreasing. Restaurants and hotels remain consistently strong outlets for higher unit value fish products and are thus significant for both seabass and seabream.

Consumers from most countries demonstrate a strong preference for fresh / chilled seafood; although the acceptability of frozen and other categories does vary, seabass and seabream are preferred fresh. In France, the UK and many other countries supermarkets play an important role in the market for aquatic food. Typically the multiple retailers have market shares of over 70% of chilled fish and in excess of this in frozen and canned fish products. However the dominance of supermarkets in fresh product is not universal and in Germany, whilst retailers carry a comprehensive range of frozen and processed fish products, only a limited number of these stores have fresh fish counters.

Supermarkets now play an important role selling farmed fish and other new species. Most chains source supplies of seabass and seabream that meet quality specifications consistent with the standards of their wider generic brand image, although not all specifically brand non-packed chilled fish. Indeed the sale of significant volumes of fish from fresh fish counters reduces the opportunity to establish brand awareness and associations with particular producers. This is overcome in some cases where the association is highlighted and features prominently as part of the product offered. With some upmarket exceptions, price is commonly critical to the retailer and high volumes of seabass and seabream are often sold through low price promotional campaigns. In some countries, including Spain and Germany, this has led the species to be perceived as a 'sales' fish and negative associations are thus established which can impact on the product.

In France consumption of seabass, especially wild fish may be more important in the catering segment. Both species are sold through traditional retailers with about 45% of fresh seabream reaching householders through fishmongers. Commonly, independent fishmongers claim a reluctance to sell farmed fish of any sort but closer

inspection often reveals this to be unsubstantiated. The UK market exhibits a preference for seabass in both the catering and retail sectors, although some supermarkets do periodically offer smaller whole seabream too. With seabass there are again highlighted divisions between that from wild capture fisheries and farmed, although the latter are quite acceptable.

In all countries both wild species are popular in restaurants and specialist catering industries where consumers are willing to pay high prices (see Spain, Germany). In Italy wholesalers were reported not to distribute wild seabass or seabream as they are caught in small quantities and sold directly to local buyers who are prepared to spend more than 12-14 Euro/kg. The restaurant and catering sectors are viewed as important growth areas for fish products in the future.

The market for both seabass and seabream in the Nordic countries is limited to fresh whole fish. For the Nordic countries the wholesale price for fresh farmed sea bass / seabream is steady and ranges between 7-8 EUR/ kg excluding VAT (2003). Wholesale price is influenced by the relatively high costs and problems experienced in transporting fish from Southern Europe, this is not helped by small consignments which add to the costs. Supermarkets have the infrastructure to handle the product and normally add 120-130% to the price depending on the general price level of the product. In a number of markets, and notably Finland and Sweden, seabass and seabream are in very early stages of development but statistics show that these markets are growing rapidly as is also so in the Netherlands.

4.4.2 Seasonality of demand

In France, seabream consumption is fairly even throughout the year with about 25% of total volume being consumed each quarter (all seabream species included). While seabass sales are slightly more important at the end of the year, reflecting an increase in demand at Christmas and reinforcing the perception that the product is for 'special' occasions, as in Croatia. Similarly Spain demonstrates high seasonality in spring, summer and Christmas. Mediterranean countries such as Greece have peak consumption of fishery products in the spring and summer months with significant tourist components of this upturn in demand. In general demand for seabass and seabream from aquaculture increases in the summer months.

4.4.3 Current product forms in each sector

The range of bass and bream products has expanded within the past 3-5 years although the major share of the market remains dependent upon the traditional whole fish concept. With a few exceptions aquaculture producers still market a very high percentage of products in a raw-material format, similar to that at the point of harvesting. To some extent this tendency simply reflects the original high unit value basis of aquaculture species, and is rooted in the original rationale for decisions to produce them: initially high species prices. However as prices continue to decline through the increased supplies produced there is a greater need to seek alternative ways to present aquatic product to consumers if margins are to be maintained, or decline at a lower rate. More fundamentally there is the need to market bass and bream as a more competitive food product more consistent with contemporary consumer demands. In many respects farmed aquatic products have retained a curious elementary position relative to other competing food products, by seemingly choosing to forego opportunities to add value.

Before considering the fuller prospective range of value adding opportunities in bass and bream, it should be recognised that value adding need not necessarily infer raw material transformation. Value can be added simply by enhancing the inherent attributes of the natural product. This is perhaps best typified by considering the example of emphasising the naturalness of the product, seemingly an obvious and simple point, but potentially a mark of differentiation that is often not used. Whole, head-on fish have important roles to play in the market and it is likely that many market sectors will continue to exhibit this preference for the foreseeable future. As well as many 'standard' mass-market positions, the whole fish product form can incorporate the premium niches with the market, especially in the more traditional foodservice sectors where the purchased product includes resolution of the perceived problems: preparation. But even where there is only limited tradition of buying whole fish, acquiring awareness of solutions and confidence to deliver through foodservice experiences can help to encourage purchase of whole fish for consumption at home. These opportunities are evident to retailers and so they can be expected to continue to demand whole fish. The question then becomes one of identifying how this need might be better satisfied by producers.

At present the market evidences effective homogenisation of the raw material; this has been noted in a number of country reports where commonly distribution channels leave little scope to disentangle different suppliers,

let alone promote the further USPs of particular producers. Failure to differentiate the good from the bad inevitably results in the generation of a commodity whose perceived quality level is commensurate with the lowest common denominator. Irregular standards in respect of grades, freshness, taste, visual appearance etc are commonly noted within the whole fish sold and this admixture can do nothing to enhance the generic product reputation. Indeed on the contrary, at a time when trying to reach new consumers of the farmed product, and convert those familiar with the wild, such offerings are clearly counterproductive. More is made of this in the specific context of quality schemes and labelling, but it must be recognised as a trenchant marker of the need to establish product standards apposite to those demanded by consumers if declining profitability is to be realised in the longer term.

The whole fish orientation of bass and bream currently evident has precedents in many other aquaculture markets worldwide, and has undoubtedly an important role to play as noted above. However it should be recognised that those farmed species first launched onto the market have subsequent product histories of greater diversification and adding value. This is most evident in the case of salmon, but can be seen to emerge in other species such as catfish, tilapia, barramundi and other more recent entrants. This would suggest that bass and bream might consider adoption of this route, as a supplement to existing market segments and product range.

From a technical perspective, that a larger proportion of cultured product has not been subject to some form of transformation is surprising because most if not all of the technical solutions to fish consumers' wants have been adopted from the established processes and precedents within capture-based fish processing operations. These have already been shown to be capable of successful application to farmed fish. Fillet yields of 40-50% have been reported and cited, by some, as reasons for retention of traditional whole fish products. However these yields are commonly incorporated within other fish species and it has proven possible to ameliorate perceived losses through the convenience value added to the product, for which the consumer is willing and able to pay, and possibly through improved utilisation of flesh recovery from frames currently discarded.

4.4.4 Costs and margins in the distribution chain

Margins in the Portuguese distribution chain are 30 – 50% for traditional retail levels and 15 –20% for supermarkets. Germany has estimated margins of between 20 –30% between each stage in the supply chain. Spain has estimated that about 50% of the final price of seabass and seabream is absorbed in the distribution chain and commercial margins for retailers range from 20-30%. The relative high price levels of seabass and seabream may hamper introduction into more market channels. Packaging can contribute up to 25% to the cost of a product. Value added products and retailer requirements will increase consumer packaging and price of the product to the consumer.

Nearly all products are transported by road with journey times between 4 and 6 days from south to north European countries. Generally there is a lack of co-ordination of distribution. For example fish from southern Europe passes through a logistics hub in Frankfurt and returns to the south for distribution in southern Germany – adding at least two days to the age of the fish.

The intermediaries and final retailers are commonly in a position of market power and so are able to extract profits at the expense of the producer and consequently, the consumer who bears the high price for the product. Existing distribution systems also appear to contain a series of problems regarding payments and terms within the channel intermediaries and would suggest that there is scope to improve the efficiency of operations.

4.4.5 Marketing activities for seabass and seabream

Invariably there is little if any attempt to more actively market the species and consumers are given little specific information in terms of product attributes and information for preparation. As the product moves through the distribution channels the product looses identity in terms of its specific point of origin and traceability. This is not helped as current handling practices often lead to the generation of lots prepared for export markets and compiled from various admixtures of producers. These producers have little idea of the final retailer, what the retailer's expectations of their product are, or even what the customer's expectations are for the product. For example Greek products are exported under the term 'Greek aquaculture origin'. This failure to engage in any dialogue does nothing to establish what consumers might want nor indeed consumers' empathy for product from particular suppliers.

Overall, market promotional activities for fish and aquaculture products are low profile. In a few countries For example in Belgium, there is an attempt through non-profit 'associations' to co-ordinate fish marketing while in Italy, the National Aquacultural Plan provides guidelines for marketing and promotional policies to improve consumer demand. In some countries promotional campaigns for quality fish include pamphlets and other point of sale (POS) materials, eg Portugal. In Croatia seabass and seabream products have been available for at least two decades yet people remain reluctant to buy them. In order to address this, the Directorate of Fisheries has arranged some educational round tables and workshops with appropriate stakeholders to improve knowledge of aquaculture products.

Marketing and promotional activities are somewhat better developed in Germany through the use of leaflets, fact sheets, wallcharts in fishmongers and special recipe cards. The overall impact of advertising on the German consumer is difficult to estimate although one trader in Hamburg claimed a 40% increase in tuna sales to be due to a ten minute TV cooking programme. Within the UK there have been periodic initiatives to promote fish aside from the branded campaigns of private companies. These generic campaigns, more recently confined to below-the-line promotions have typically highlighted the health benefits of fish and have attempted to promote consumption of less favoured species. Farmed fish promotions have been dominated by salmonids with Scottish Quality Salmon and British Trout; these too tend to rely more upon POS support.

4.4.6 Quality schemes for seabass and seabream

The BSE crisis in Europe triggered strong media and public attention from the latter part of the 1990s. Since then consumers now express preferences for high quality food products, traceability and generally claim to demand healthy products with high nutritional value. Of course these aspirations are not always backed with a commensurate willingness to pay. Country responses to growing public concern have been mixed but include to varying degrees implementation of traceability procedures, HACCP, quality control programmes, labeling and better communications. The more widespread circulation has brought some concern about the authenticity of 'quality labels', what benefits they actually confer and whether they give the consumer the information required or capable of being understood within the point of purchase environment.

Like most countries there has been an upturn in the use of certification and quality systems which attempt to confer compliance with relevant standards. Compliance procedures are also administered by various national bodies, for example public health inspectors in the UK, veterinarians in many continental European countries and a well developed system of producer organizations in Spain.

4.4.7 Interaction between farmed and wild caught seabass and seabream

Some 90% of fish imported to the Scandinavian markets is farmed fish and there is no interaction between farmed and wild seabass / seabream. In Belgium farmed and wild caught seabass and seabream have only a very small market where the species are sold to specific niche restaurant markets. Direct interaction with other aquaculture species is not obvious. In Portugal 80% of seabass and 90% of seabream sold originates from farms. Other species such as *Diplodus sarga* and *Pagrus pagrus* are similar species could compete with seabream.

In Croatia there is no perceived difference between farmed and wild seabass and seabream. Here the lack of legislation regarding traceability means that farmed fish is often sold as wild caught. Other species such as *Puntazzo puntazzo* or *Dentex* account for less that 5% of total production and do not have any competitive implications on the market.

In Germany, both seabass and seabream fillets are priced to compete with monk fish fillets. The German market is dominated by much cheaper whitefish such as Alaskan Pollack fillets which are available at 4-6 euros/kg, compared to seabass and seabream fillets which start at 15euros/kg. As is generally the case, seabass and seabream are relatively unknown in the German market.

As noted above there are points of differentiation between wild and farmed seabass in the French and UK markets, with the former being regarded as superior and for which price premiums are paid.

4.4.8 Interaction between emerging aquaculture species and seabass and seabream

The interaction of bass and bream with other emergent species is difficult to predict with any certainty and in any case, observations will necessarily be influenced by more localised preferences. Whilst economic analyses of the markets for co-integration have suggested limited impact, more qualitative considerations have suggested intuitive interactions. Historically consumers' purchasing behaviour has shown them to have varied expressed preferences for different species and volumes of fish. Whilst in some countries fish is, and has always been, a dominant component of protein in the diet; in many others where a choice of alternatives exists, fish is less preferred. The addition of new species into the market might therefore be expected to meet with acceptance of the new at the expense of some existing alternative, and perhaps only then on a trial basis.

Historically new aquaculture species have been launched at an initially high, if not premium, price. Typically this reflects their pre-launch high price selection criteria and recognition of the ability to charge a higher price for a comparatively scarce product. For example farmed cod and halibut are currently enjoying such a position ion a number of north European markets. Notwithstanding the development of cost savings in production over time, consumers might be expected to be less willing to pay any differential price premium as the range of alternative fish products expands. Clearly the lesser the perceived differential between new products launched, the less will be its ability to support a higher price ticket. For future new products this may well mean that the 'honeymoon' period of initially high premiums enjoyed by earlier farmed new entrants is less likely to be present in future. Consequently producers will have a shorter time within which to recoup their R&D costs and may ultimately tend to stifle any tendency to innovate.

The alternative route to launching new species, as observed within the salmon sector, is likely to be diversification of existing products. This trend might be encouraged further by declining production costs enabling some absorption of processing costs and thereby help generate the opportunity to added value. Beyond the salmonids a number of other candidates are evident and can be expected to launch within the next decade. The rate and nature of NPD can be expected to reflect the divisions between those species commanding higher prices and still targeted largely at the top-end of the market, eg halibut, turbot etc, through to those species such as African catfish, tilapia, which are more likely to be utilised as a building component of other added value products. Whichever route is taken it seems inevitable that there will be more interaction between bass and bream and other farmed species.

4.4.9 Actual or potential trade barriers

As the EU market expands greater integration will, by default, tend to promote wider adoption of common marketing standards through official legislation. However in many respects there is already a common level of practice through the need to satisfy international market requirements. More recently measures such as stipulation of farmed or wild-caught production methods and country of origin have been implemented within the EU and it seems inevitable that such practices will become standard practice rather than a potential mechanism for discrimination. A similar history is evident in respect of health and hygiene directives, key target markets tend to place similar demands on their suppliers and whilst there have been cases of non-compliance in the past, these have generally resulted in adoption of the appropriate standards not least often because of the comparative paucity of the alternatives remaining.

Species nomenclature embraces a long history and there have been various debates about the significance of what is and is not permitted. Whilst there have been reports of consumers' lack of knowledge about the fish creating difficulty in identifying seabass and seabream due to the many names that the species trades under there are likely to be questions as to the longevity of any such problem. Typically consumers become familiar with localised translations and these commonly survive any attempts to impose some standard alternative.

4.5 Future of the market for seabass and seabream

4.5.1 New product forms

In many markets both seabass and seabream are still almost exclusively sold whole, and very little is frozen. But if producers are to improve their margins there is arguably a need to take on board the need to become more involved in the addition of value, or to structure their channels to integrate such activities. Currently provision of such simple varied products like fillets is seen as an additional service rather than an integral

option of what the producer can deliver. Packaging other than the possible incorporation of the minimum quantity of ice is often seen as an additional and unnecessary cost.

Such practices reflect a common lack of concern with any attempt, or perceived ability, to attempt to differentiate output on the market. Yet comparatively simple steps could make quite substantive inroads to improving margins and future prospects. Elsewhere in aquaculture this trend has been accelerated through a variety of routes including mergers and takeovers within the fish farming and fish processing sectors to achieve vertical integration and in some countries, the establishment of discrete outsourcing of activities is fast becoming an integral part of the value chain. In these instances aquaculture producers have seemingly latched on to the concept of adding value in much the same way as has been done elsewhere within the capture fisheries products and wider food markets more generally.

Currently though the markets reflect a wide diversity of responses to seabass and seabream. For example, as in many other markets consumption preferences in Scandinavia remain conservative in seabass and seabream, despite some of the more diverse consumption practices of aquatic foods to be found in the world. Undoubtedly there are many opportunities for increased consumption of fresh and farmed seabass and seabream, but the main limiting factor is its relatively high price, lack of species knowledge and the presence of high quality substitutes produced locally. However in other countries, notably Portugal and Croatia, where the product is cheaper there has been no significant development of new product forms with farms typically being traditional and resistant to change.

Nonetheless there is some evidence of a growing demand for more convenient products based on seabass and seabream. New product forms include pre-packed fresh fish fillets, sushi portions, fresh marinated portions and ready-prepared meal accompaniments such as the oven-ready stuffed bass trialed in the UK market. Italian producers are starting to diversify into filleted and gutted products and are taking steps to modernise plants and improve labeling and packaging. In addition many producers are now beginning to recognise the scope to add value through improvements in product quality, hygiene, environmental growing conditions and indications of species origin.

In southern Germany and Austria whole fish and fresh fillets are available, in addition to fillets offered with cooking ingredients such as spices and lemons or with a marinade sauce. Currently it seems unlikely that new product forms outside of whole fresh fish and fillet products can be warranted but pre-packed and ready to eat forms are potential products, although some claim that the fish needs to be seriously promoted before introducing these new products. Some observers also consider there to be a danger of misreading consumer perceptions of the product. In some market environments frozen, marinated fish and ready meals are frequently regarded as prepared from low value species or raw material nearing the end of its shelf-life. In other markets however, there is the established recognition that frozen fish may in fact be superior to that marketed fresh. This complexity of perceptions, often seemingly contradictory, but in practice grounded in local experience and established cultural beliefs can pose formidable challenges to the acceptance of new products. Nonetheless precedents for the acceptance of a wider range of new aquatic farmed products do exist.

Salmon, of all the species farmed internationally probably exhibits the largest product range and to a considerable extent may be regarded as a foretaste of future farmed fish products. Diversification of salmon has been greatest within the fresh/chilled sectors where a number of added value products incorporating increasing levels of technical sophistication have proven acceptance and profitability on the market. Salmon products have evolved from variations on the whole fish concept through fillet and portion options into ready meals and deli-level products. This has enabled salmon to trade upon its strong traditions of smoked product in order to facilitate the launch of numerous added value variations. These have expanded from the concept of smoked sides / slices through to niche-orientated innovations with hot and cold smoke versions of product spiced in a number of ways. Whilst there may not be the same product heritage in seabass and seabream there is no evident reason why similar product concepts might not be adopted. For example, lower fat levels as found in other fish (and seabass and seabream) have not been a barrier to the development of other white-fleshed species. And over time the market for foods generally has shown consumers to have more interest in a wider and more varied range of food choice, in part derived through wider experience of travel and more plural foodservice.

In north European countries, and increasingly those around the Mediterranean, most of the new aquatic food products have been launched with the chilled sector, but many, and in some cases virtually all, have been marketed in frozen forms too, although in some cases traditional consumer preferences have curtailed expansion in this direction. Nonetheless, as with capture-based aquatic food products, the convenience of frozen has opened up a number of additional market opportunities, not least where traditional distribution channels have proven problematic. Advances in icing and other still comparatively new packaging technologies

such as MAP and VSP will inevitably encourage yet further innovation. This trend is likely to accelerate as similar technologies appear and gain acceptance in other foodstuffs too.

Rather lesser emphasis has been placed upon the canned product, and the related retort pouches. This is not surprising given the traditional perceived orientation of such products to more down-market raw material sources and the higher production costs. Nonetheless there are significant and increasingly important market segments which have attracted some interest from aquaculture producers; farmed salmon has again been to the fore in this with the addition of salmon fillets to various sauces and other accompaniments. Moreover as the EU expands, it will incorporate food preferences which have already accepted positions for canned white fish products, notably carps, and these may well set precedents of what could emerge in the future bass and bream added value product range.

Product variation may also be encouraged as labelling confers yet further opportunities to differentiate products. Various USPs might be incorporated ranging from brands associated with individual producers, regions, (legally required) country of origin and other generic standards. Such simple points of differentiation have long since been employed within captured fisheries products and their wider transgression into species such as salmon and subsequent evolution into more discrete niche sectors such as Label Rouge in France, and organic in may other countries all helps to broaden the market profile and engender an awareness, and with it increasingly an expectation, of a more diverse range of aquatic farmed products.

4.5.2 Strategic options

The marketing function

Much has been made of the need and potential for NPD in bass and bream and undoubtedly this will continue to play an important and central part in the evolution of the market. However successful NPD is critically dependent not just upon creation of the new product concept but also upon its delivery and then communication; promotion should only be undertaken if there is confidence of being able to deliver expectations created. Indeed the delivery of the values which have been identified to be lacking in the market research process preceding new product creation is central to the satisfaction of consumer expectations and a prerequisite for the long term sustainability of the sector. Hitherto these components of marketing strategy have tended to be adopted in a somewhat arbitrary piece-meal fashion which has done little to assist the wider development of the farmed bass and bream sector. For example, criticism has been made of the sector's production-led focus without commensurate emphasis upon promotion within the market. Whilst promotion activity may well have been absent it is debatable whether this was needed at a time when there were other more fundamental deficiencies within what was being offered to the market. Arguably to have heightened awareness of deficient supplies could be regarded as even more damaging than the waste of promotional resources.

Clearly there has been an absence of a concerted approach to marketing and this has been particularly significant because of the innate absence of product differentiation which has afflicted much of the output. This has encouraged a natural tendency to see bass and bream more as a homogeneous commodity rather than a heterogeneous offering from a variety of different producers, based in varied locations, each with particular and distinctive attributes. The common, current perception of bass and bream, especially from its largest producer, as a homogeneous commodity carries the distinct disadvantage that favourable perceptions can only ever reach the height of the lowest common denominator. This suggests that there is much need to agree apposite standards and realistic mechanisms to ensure implementation, monitoring and control throughout the chains serviced.

Marketing infrastructure

Realisation of improvement in the marketing function would suggest that a fundamental strategic emphasis should be placed upon the infrastructure of the marketing chain. The deficiencies within the chain were widely reported and, unsurprisingly, were most evident from those points of the market furthest from the production centres but typically expected to pay the highest prices to cover the transport costs incurred. Delivery of some of the poorest quality product to the highest paying market sectors will ultimately do nothing other than invite rejection from those consumers who might just be persuaded to make a purchase once. Moreover, consumers increasingly have consumption experiences from elsewhere and have some expectation of what should be delivered.

Logistics and Distribution

In keeping with the above comments it would seem desirable for producers to devise ways in which product distribution might be improved. Models of distribution systems devised for captured fish supplies are widespread and have evolved within systems of far greater supply uncertainty than is typically encountered in aquaculture. In a number of cases these have involved the sharing of facilities by competing firms which has proven to be the only way of maintaining margins at a level that end consumers are willing to bear. Comparatively small and disparate producers might explore alternative distribution mechanisms to improve the quality of product, especially that from Greece, which is currently considered by many to be inferior. Distribution channels to many north European countries of 4-6 days do much to undermine potential unique selling points (USPs) of freshly harvested aquaculture product. Especially with the greater role of large supermarket chains, more sophisticated logistics which tie in with the limited and constrained windows in distribution centres are essential.

Retail markets

Within all the markets it was evident that the supermarket chains are either already or fast becoming the dominant force. Undoubtedly there will remain a component of the domestic market which will be serviced by the specialist traditional retailer. Whilst these may remain significant, not least because of their tendency in many countries towards superior quality products at commensurately higher prices there seems little reason to see why supermarkets will not consolidate market share as surely as has been done in all other foods. The concentration of retail power within a comparatively small number of chains results in the need for producers to be able to negotiate and trade with organizations much larger than their own.

Supermarkets demand compliance with a much broader range of procurement criteria than price alone and commonly these extend into the need for technical resources outwith the scope of all but the largest aquaculture producers. Given the comparatively small scale of many operators in bass and bream this is potentially all the more significant and may suggest merit in a more consolidated approach. Notwithstanding individual chains' professed desire to develop partnerships and longer term relationships, other drivers are very important within the market. Typically these are geared to driving down their own product costs, improving shareholder profitability, rationalising supply chains and enabling greater control and verification of supplies. Whilst it may be comparatively easy to gain market entry to certain supermarket chains, assuming quality, price and other procurement specifications can be agreed, negotiation and retention of terms which prove profitable to the producers is not readily achieved. Non-price factors can be critical to the comparative advantage offered and may well prove the critical element in the longer term.

The technical resources of supermarkets typically extend into food science and technology wherein teams will be dedicated to the identification and development of new products. Understandably many chains undertake these initiatives with high regard to their commercial sensitivity, however this need not preclude collaboration and advantages can accrue to both parties. The extremely wide range of products typically stocked by supermarkets does tend to ensure broader sectoral experience than is held with most aquaculture groups and especially in areas such as added-value and ready meals this level of expertise may prove invaluable. Of course there are potential downsides to such initiatives and rather different approaches may be adopted through foodservice channels too.

Foodservice markets

The foodservice, or catering, market covers a wide diversity of outlets geared to provision of food away from home. The varied importance of these constituent parts has been noted in different countries and the potentially wide range of product standards and characteristics remains an important feature. Whilst the foodservice sector has the potential advantage of being geared to accept a far greater range of product specifications, eg those wherein price is of paramount importance through to those where product quality is above all else, the sector is different in another often over-looked respect. Within its restaurants and other establishments the foodservice sector is far more able to solve consumers' problems of unfamiliarity, lack of awareness through its provision of fish product solutions. Pulling consumers through the learning curve in this way increases the probability of encouraging consumers to buy similar products from retailers for preparation in the home. Targeting new product options through this channel can thus generate far more than the possibility of short-run gain in a highly competitive market.

Pricing

Whilst there may be a case for the sector to have the ability to clear large volumes at low prices within short periods of time, such actions need to be undertaken with more precision and be directed at channels which will not grossly convolute price and product signals normally sent to consumers. For example, observation of bass and bream at prices but a fraction of their normal selling price makes it far more difficult to regain higher price levels at a later time. Previous tendencies to market inferior quality (in terms of freshness, size,

appearance and condition etc) bass and bream must also be recognized to have both the potential and the likelihood to cannibalise sales of higher quality product from elsewhere and at other times.

Promotional activities
Promotional activities provide for a range of instruments to undertake and attempt many different objectives. Unfortunately, perhaps because familiarity tends to engender false senses of understanding, promotion campaigns are often cited as being the necessary, sometimes only solution to a wide range of marketing problems. As has been demonstrated in a number of countries there can be a role for advertising and this may be undertaken on a private and/ or generic basis. However the costs and benefits associated with such activities frequently suggest that alternative instruments might prove more efficient and effective mechanisms.

The whole process of improving product communications has become far more central to aquatic food marketing over recent years, not least as a mechanism to provide verification and reassurance about product origins and the interim chain of custody. Communications within the chain to associate product with particular production regions, and methods such as organic, may invoke use of labeling and other certified POS support. Given their wider adoption across many food categories it seems inconceivable that aquatic food producers will be able to much other than comply in similar fashion.

Increasingly promotion might also be expected to be used as a means to deal more proactively with environmental concerns and related green issues. Although bass and bream has not received that same levels of criticism as have been leveled at other aquaculture sectors, notably salmon, the interaction of user groups inevitably holds scope for conflict and condemnation. Preparation of credible communications strategies needs to be seen as but one part of the overall set of strategic options aimed at improving the prospects of the seabass and seabream industry.

4.5.3 Potential demand 2002-2008

Introduction
In making forecasts of potential demand for bass and bream up to 2008, a number of factors need to be taken into account, including the following:

- past consumption trends (if past consumption is flat, future increases in consumption are less likely)
- relative consumption of bass and bream compared with other fish products (if relative consumption is high, further increases in consumption may be difficult)
- availability of product substitutes (if good substitutes are available, especially on markets where bass and bream is not well known and may be more highly priced, development of bass and bream sales will be more difficult)
- effective initiatives in market development, including improvements to existing products, new products, improved distribution and availability, quality assurance, branding and promotion (lack of such initiatives is likely to significantly reduce demand)
- pricing of bass and bream in different market sectors (price levels need to meet the needs of the different parties in the supply chain, including the consumer)

These factors have been taken into account as far as is possible in making projections of demand, and again both baseline and optimistic forecasts have been made. The forecasts to 2008 have been divided into two periods, the first 2002-2005, and the second 2005-2008. During the first period, for both forecasts demand is expected to remain relatively flat whilst industry rationalisation occurs, prices stabilise, and market development plans are made. During the second period, the baseline forecast assumes only a limited impact from market development, continuing rationalisation, and no major reductions in production or selling cost, with only a relatively small increase in demand. The optimistic forecast assumes that industry rationalisation has been largely completed, that there might be small but important reductions in production cost, and that market development efforts are more stringently and successfully pursued, resulting in a significant increase in demand. Within this overall picture, there are likely to be significant differences in consumption trends between markets in different countries.

Forecast demand

The growth rates assumed in the following country-by-country analysis take into account anticipated production, the relative maturity of markets, trend growth rates from 1998-2002, and per capita consumption levels in relation to overall fish consumption.

Table 40: Per capita consumption of seabass and seabream as a proportion of all fish consumption in 2002

Country	Population ('000)	All fish consumption (kg/cap.)	Bass and bream consumption (kg/cap.)	Bass & bream as %
Italy	57,600	24.6	1.15	4.7%
Spain	40,000	44.6	0.97	2.2%
Greece	10,600	25.0	2.09	8.3%
Turkey	67,600	8.0	0.32	4.0%
France	60,000	31.2	0.17	0.5%
Portugal	10,000	76.2	1.34	1.8%
Germany	83,000	13.3	0.02	0.1%
UK	60,000	21.6	0.05	0.2%
Croatia	4,600	8.0	0.54	6.8%
Cyprus	784	18.0	1.73	9.6%
Netherlands	16,000	20.6	0.04	0.2%
Belgium	10,200	21.6	0.04	0.2%
Austria	8,100	13.3	0.04	0.3%
Malta	390		0.27	
Ireland	3,800	16.0	0.02	0.1%
Denmark	5,300	26.5	0.00	0.0%
Sweden	8,900	30.9	0.00	0.0%
Finland	5,200	32.1	0.00	0.0%

The country with the highest per capita consumption in 2002 was Greece at 2.09kg, around 8.3% of all fish consumption (see Table 40). This level of consumption remained constant over the period 1998-2002 (see Table 39), thus indicating a mature market which despite a reduction in price showed no signs of increasing further. This level of consumption was however achieved without any great degree of promotion or marketing, and industry sources believe consumption could still increase further given the right approach to market development. For the baseline forecast, it is assumed that there will be no market growth until 2005, and then only limited growth of 2 % p.a. until 2008. For the optimistic forecast, growth of 3% p.a. is assumed until 2005, then increasing to 6.6% until 2008.

Italy has the largest market for bass and bream, and is also considered to be relatively mature. This is reflected in the relatively modest increase in consumption over the period 1998-2002 of 6.6% p.a. (see Table 39), again despite a significant fall in price. Consumption per capita in 2002 was 1.15kg, around 4.7% of all fish consumption, still some way below that in Greece and suggesting that further gains are possible. For the baseline forecast, it is assumed that demand falls by 1% p.a. until 2005, reflecting a reduction in imports from Greece as a consequence of falling production and a hardening of price, and then growing by 3.3% p.a. until 2008 (half the 1998-2002 trend rate). For the optimistic forecast, 3.3% growth is assumed until 2005, then reverting to the 1998-2002 trend rate of 6.6% until 2008.

Consumption in Turkey in 2002 was the same level as in 1998 at 0.32kg per capita, 4% of all fish consumption (which in Turkey is relatively low at 8kg per capita). However, consumption in 2000 had reached a significantly higher level of 0.49kg per capita before falling back due to the internal economic crisis. The baseline scenario assumes that this level of consumption is again achieved by 2008, with 3.3% p.a. growth to 2005 and 15% p.a. to 2008. For the optimistic scenario, 10% growth is assumed to 2005 and 15% to 2008. Turkey is the only country where population is forecast to grow significantly; from 70.8 million in 2003 to 76.4 million in 2008, and this factor alone will encourage an increase in consumption.

The two markets that grew the most rapidly over the period 1998-2002 were Spain and Portugal at 50% and 46% p.a. respectively. This was driven mainly by the large increase in imports from Greece following relative saturation of the Italian market, together with the fact that Spain and Portugal are the largest market for fish in

Europe, with the highest per capita fish consumption levels of 45 and 76kg respectively. Consumption of bass and bream in 2002 in Spain was 0.97kg per capita (2.2% of all fish), and 1.34kg (1.8%) in Portugal. These relatively low levels of consumption as a proportion of all fish consumed compared with Greece and Italy suggest further strong growth in demand is possible. The baseline forecast for both countries assumes relatively slow growth of 3.3% p.a. to 2005 reflecting industry rationalisation, increasing to 10% p.a. to 2008. This gives per capita consumption of 1.42kg (3.2% of all fish) and 1.96kg (2.6% of all fish) for Spain and Portugal respectively. The optimistic forecast assumes 6.6% p.a. to 2005 and 15% p.a. to 2008, giving per capita consumption of 1.85kg (4.1% of all fish) and 2.55kg (3.4% of all fish) for Spain and Portugal respectively.

Consumption in France grew by 14% p.a. from 1998 to 2002, reaching a level of 0.17kg/capita, around 0.5% of all fish consumption. Although bass and bream are not as well appreciated by consumers as in Italy and Spain, especially away from the coast, it is clear that demand has the potential to increase further, albeit from a relatively low base, especially given more effort on market development. The baseline forecast assumes growth of 3.3% p.a. to 2008, whilst the optimistic scenario assumes 5% to 2005 and 10% to 2008.

Consumption in the UK grew by 30% per annum from 1998-2002, although starting from a low base and only reaching 3,300t by 2002. Per capita consumption of 0.06kg in 2002 is low in relation to other fish products, but the product (especially bream) is still not widely known on the market. Nevertheless demand is expected to grow steadily to 4000 to 6000t in 2008 on baseline and optimistic forecasts.

The consumption figure in 2002 of 26,000t for "others" in Table 39 includes around 18,500t for countries not already accounted for in Scandinavia, northern Europe and the Mediterranean. It also includes a figure of some 7,500t for balancing the discrepancy between production and consumption in 2002, and represents consumption unaccounted for across all countries in official trade statistics and adjustments made to the same.

Consumption in other Mediterranean countries (Egypt, Tunisia, Morocco, Israel, Cyprus, Malta, Croatia) in 2002 was around 14,000t, and is largely based on home production with no imports and limited exports. Consumption in these countries is not expected to increase significantly, since home production potential is limited and imports from the main producer countries are unlikely on cost and transport grounds. Consumption in N European countries (Germany, Austria, Belgium, Netherlands, Ireland) in 2002 was around 4,500t based on imports, whilst in Scandinavia (Denmark, Sweden and Finland) it was effectively zero. Consumption in northern European countries can be expected to increase gradually provided efforts are made to develop markets and assuming some product development. In Germany and Austria, where consumption was estimated to be around 3,300t in 2003, it is expected to increase to 5,000t by 2008 if no efforts are made to promote the product; assuming concerted efforts to develop the product and the market are made, it is believed this figure could double to 10,600t. Consumption in Scandinavia is not expected to develop to any great extent in the period to 2008 on the grounds of the product not being known locally and being significantly more costly than local substitutes. A demand of 500t-100t might be envisaged by 2008 on baseline and optimistic forecasts given the development of emerging markets in other N European countries over the period 1998-2002. Baseline growth of 3.3% p.a. to 2008 gives estimated demand of 31,000t by 2008, whilst more optimistically growth of 5% to 2005 and 15% to 2008 gives demand of 40,000t.

The results of the above growth rate assumptions are summarised in Tables 41 and 42, and in Figure 31. For the baseline forecast, overall demand is expected to grow from 201,000t in 2002 to around 255,000t by 2008. For the optimistic forecast, demand has the potential to grow to around 322,000t by 2008.

Table 41. Baseline demand forecast for bass and bream to 2008

	Apparent consumption 2002 (tonnes)	Consumption 2002 (kg/cap.)	Average annual growth ('02-'05)	Demand 2005 (tonnes)	Average annual growth ('05-'08)	Demand 2008 (tonnes)	Consumption 2008 (kg/cap.)
Italy	66,388	1.15	-1.0%	64,416	3.3%	71,006	1.23
Spain	38,684	0.97	3.3%	42,641	10.0%	56,756	1.42
Greece	22,114	2.09	0.0%	22,114	2.0%	23,468	2.21
Turkey	21,607	0.32	3.3%	23,817	15.0%	36,223	0.48
Portugal	13,360	1.34	3.3%	14,727	10.0%	19,601	1.96
France	9,924	0.17	3.3%	10,939	3.3%	12,058	0.20
UK	3,313	0.06	3.3%	3,652	3.3%	4,026	0.07
Others	26,016	0.10	3.3%	28,678	3.3%	31,611	0.12
Total	201,406	0.35		210,985		254,750	0.44

Table 42. Optimistic demand forecast for bass and bream to 2008

	Apparent consumption 2002 (tonnes)	Consumption 2002 (kg/cap.)	Average annual growth ('02-'05)	Demand 2005 (tonnes)	Average annual growth ('05-'08)	Demand 2008 (tonnes)	Consumption 2008 (kg/cap.)
Italy	66,388	1.15	3.3%	73,180	6.6%	88,647	1.54
Spain	38,684	0.97	7.0%	47,390	16.0%	73,970	1.85
Greece	22,114	2.09	3.0%	24,165	6.6%	29,272	2.76
Turkey	21,607	0.32	10.0%	28,759	15.0%	43,739	0.58
Portugal	13,360	1.34	7.0%	16,367	16.0%	25,547	2.55
France	9,924	0.17	5.0%	11,488	10.0%	15,291	0.25
UK	3,313	0.06	5.0%	3,835	15.0%	5,833	0.10
Others	26,016	0.10	5.0%	30,117	10.0%	40,085	0.15
Total	201,406	0.35		235,300		322,384	0.56

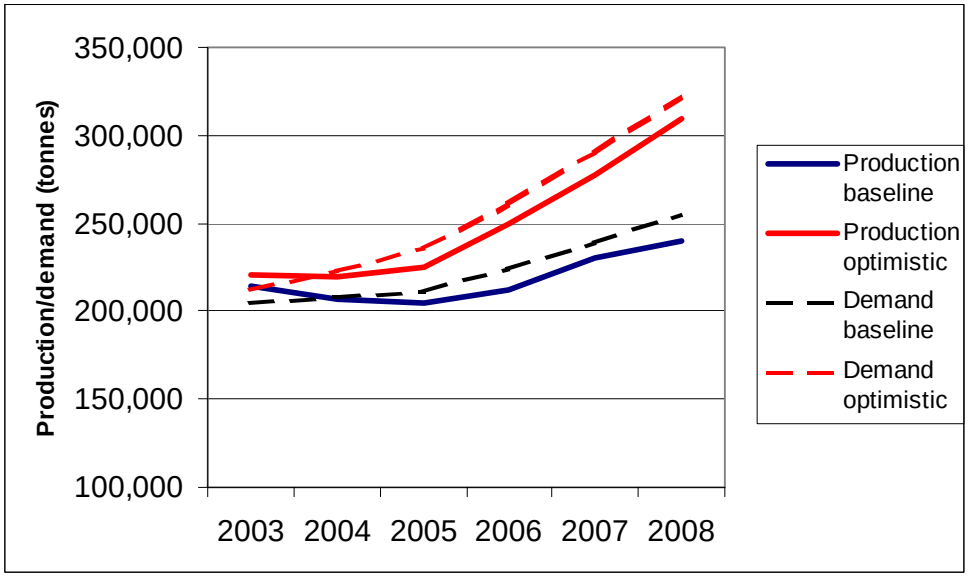


Figure 31. Forecast production and demand for the period 2003-2008.

5 The 2001-2002 price crisis

5.1 Introduction

Over the period January 2001 to March 2002, prices for bass and bream (300-450g, Greek fish in Italy) fell from €5.75 and €5/kg to around €3.75 and €2.75/kg respectively. This fall was also reflected to a greater or lesser extent in prices for other fish on other markets. This sudden fall in price plunged the industry into crisis, and lead to calls to the EU for help for the industry. One outcome of the crisis was that in autumn 2002 the EC invited member states to suspend all financing of projects which might entail a risk of creating surplus production capacity for seabass and seabream. Given that prices appeared to have fallen to below cost of production, for some of the time at least, it seemed evident that such a risk was present and therefore the measure was imposed.

This section examines the evidence for the crisis in the main markets, the causes and impacts in individual countries, and asks whether the crisis was due to overproduction.

5.2 Evidence for the crisis

Prices for bass and bream in Greece peaked in 1991 when production was only 12,000t. By 1993 production had doubled and the price had plummeted from €13-15/kg to €6.50/kg, the first "price crisis" in the Greek industry (see Figure 32).

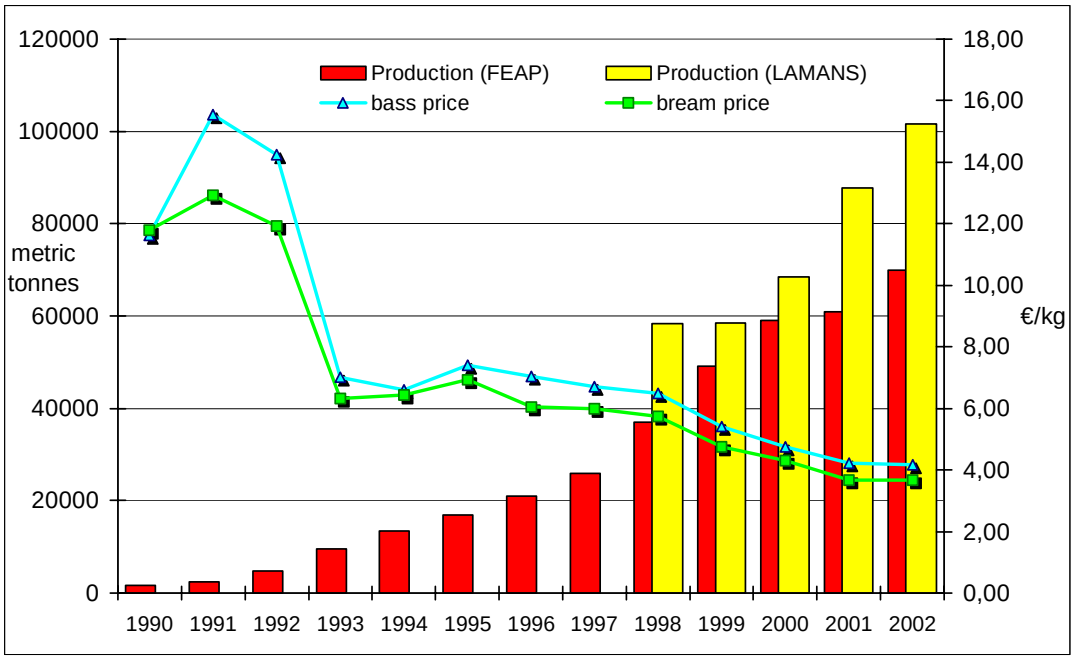


Figure 32. Trends in ex-farm price for seabass and seabream in Greece set against volumes produced

Source: Lamans SA

From 1994 to 1998 prices remained relatively stable even though production continued to increase. During 1999, prices started to slide again, falling to their lowest levels ever in 2001 and 2002 (see Figure 31). The lowest price for Greek seabass in Italy was around €3.75/kg and for seabream €2.75 in March 2002 (300-450g size range).

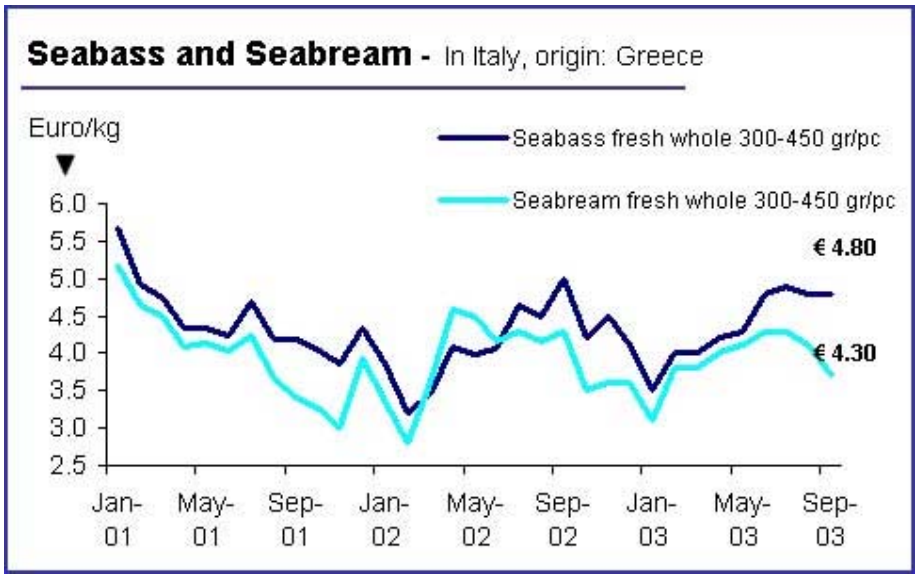
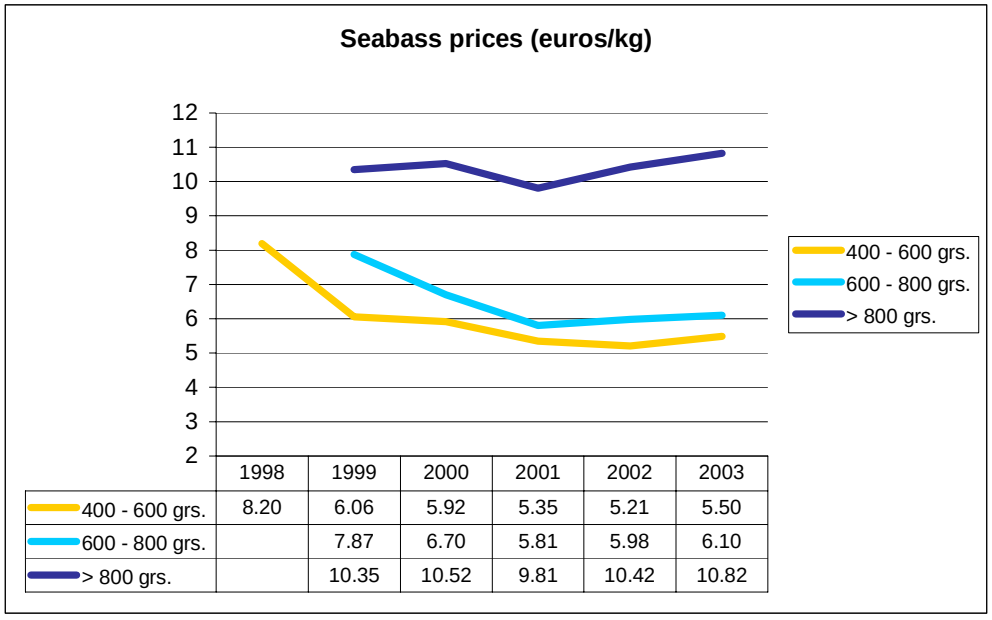


Figure 33. Trends in price for Greek fish in Italy 2001-2003

Source: FAO

This trend was repeated in other countries and reflects the interactions of importers and exporters in different markets. In France, prices for small sizes (300-400g) fell by more than 30% in 2001 and 2002. Generally prices reach their highest in France in March and then decline throughout the year to a low in November as imports increase. Following the normal pattern of decline in 2001, prices failed to recover in 2002.

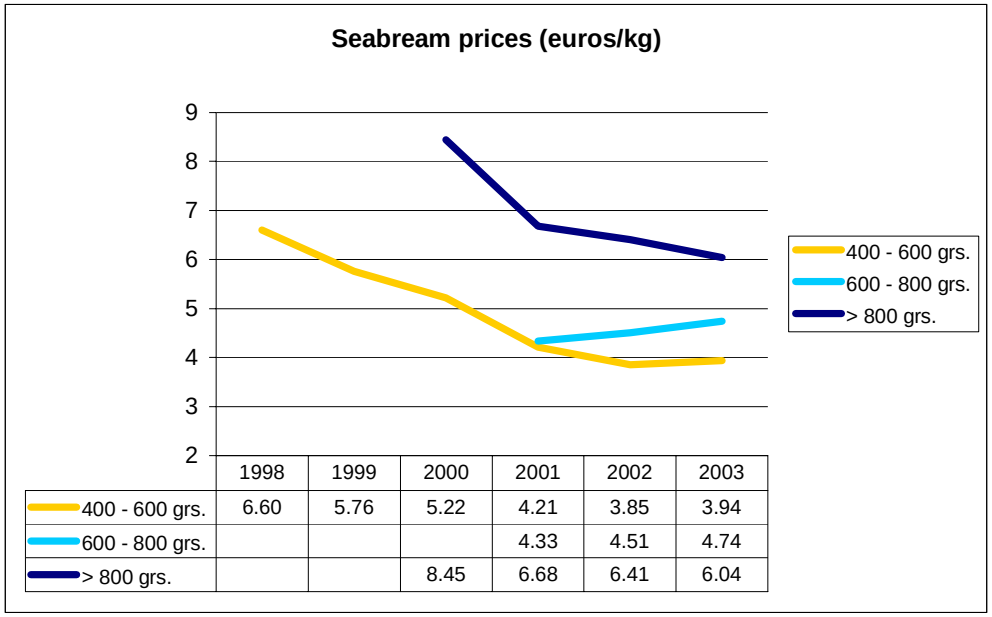
In Spain, prices for 400-600g seabass fell from €5.92/kg in 2000 to €5.21/kg in 2002 (a decline of 12%), and for seabream from €5.22/kg in 2000 to €3.85/kg in 2002 (a fall of 26%, as shown in Figures 34 and 35). The lowest prices were seen with smaller sizes, whilst for larger sizes prices were less affected and some even rose. Further evidence of the crisis in Spain comes through data from the MercaMadrid wholesale market (see Figures 36 and 37). In the autumn of 2002, prices fell from €5.0/kg to €3.50/kg as home production and imports flooded the market, clear evidence of an imbalance in supply and demand. There was an equivalent fall in the price of seabass but by no means as pronounced.



	1998	1999	2000	2001	2002	2003
400 - 600 grs.	8.20	6.06	5.92	5.35	5.21	5.50
600 - 800 grs.		7.87	6.70	5.81	5.98	6.10
> 800 grs.		10.35	10.52	9.81	10.42	10.82

Figure 34. Prices of seabass in Spain 1998-2003

Source: Spanish trading company



	1998	1999	2000	2001	2002	2003
400 - 600 grs.	6.60	5.76	5.22	4.21	3.85	3.94
600 - 800 grs.				4.33	4.51	4.74
> 800 grs.			8.45	6.68	6.41	6.04

Figure 35. Prices of seabream in Spain 1998-2003

Source: Spanish trading company

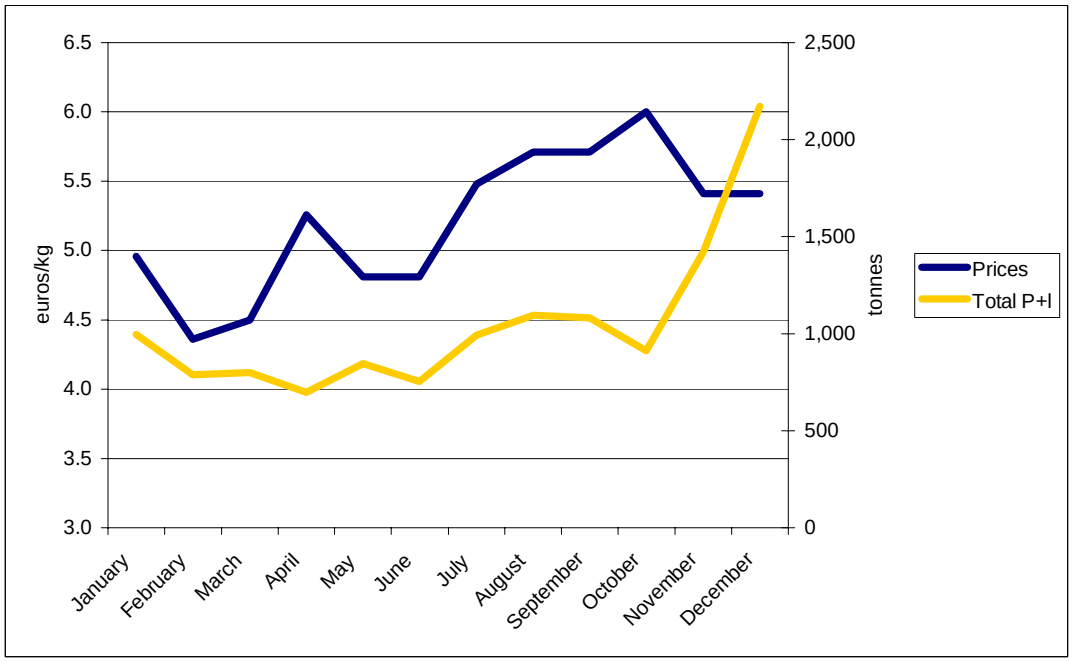


Figure 36. Seabass prices on MercaMadrid wholesale market, compared with production and import volumes in 2002

Source: FROM

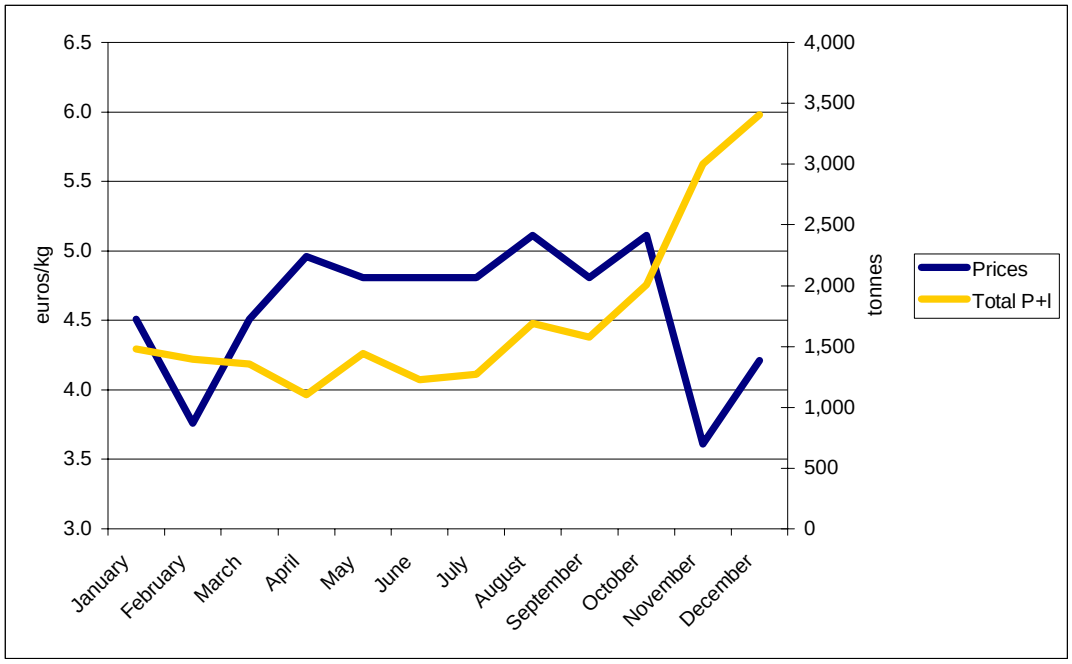


Figure 37. Seabream prices on MercaMadrid wholesale market, compared with production and import volumes in 2002

Source: FROM

Turkey also suffered a price crisis in the same period as shown in Figure 38. Prices in Turkish Lira actually rose, but with inflation running at high levels they fell in real terms.

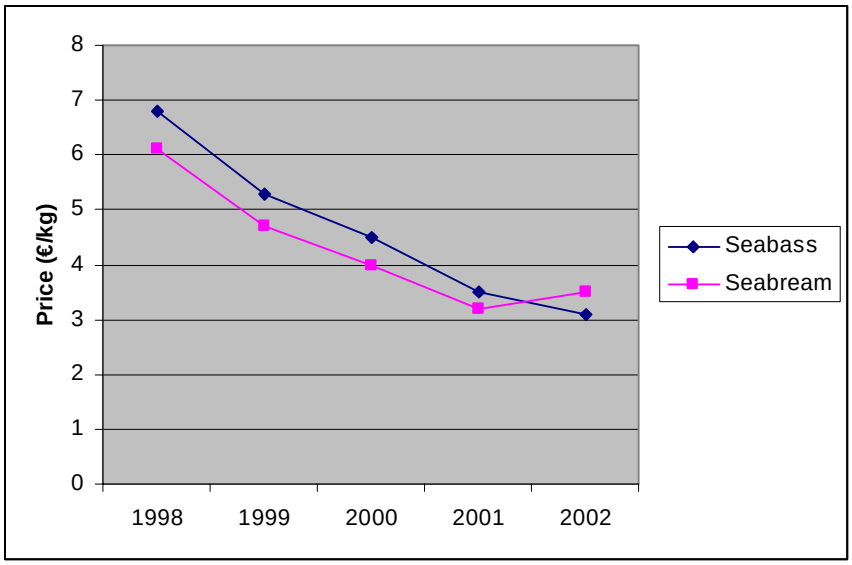


Figure 38. Ex-farm prices of seabass and seabream in Turkey on the domestic market

Source: Turkish State Institute of Statistics, personal communication

Prices in Italy for Italian produced fish (see Figure 39) were apparently not very badly affected compared to fish from elsewhere.

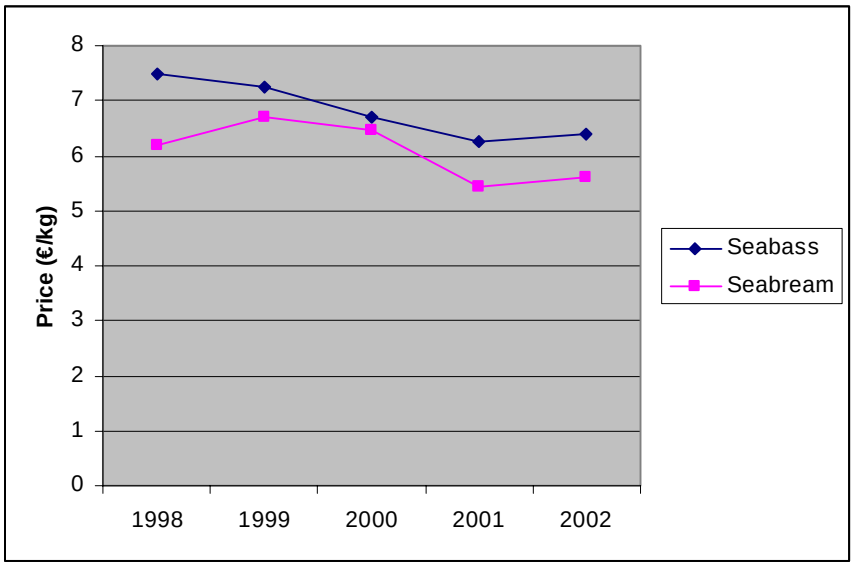


Figure 39. Ex-farm prices of Italian produced seabass and seabream in Italy

Source: IREPA, 2003

5.3 Causes and impacts in different countries

The causes and impacts of the price crisis vary from country to country as follows:

5.3.1 Greece

Particular aspects of the industry in Greece which lead to the price crisis were:

Ready availability of finance

In the 1990s, there was a huge influx of new operators to the sector, attracted by the prospect of a profitable business with major financial incentives. The ready availability of EU and national grants covering most of the capital requirements (possibly all if over-invoicing was practised), the ability to obtain bank loans on favourable terms without proper security, and the willingness of feed and fry suppliers to provide extended credit, all made entry into the business relatively straightforward and without the operator having to risk much of his own money. In addition, in the late 1990s, many of the larger farms floated on the Athens Stock Exchange, raising large amounts of money in a buoyant market. Whilst this allowed them to reduce their debt, it also gave them a false sense of security and blinded them to the realities of the market place: despite having ample funds as a result of floatation, no money was spent on developing an adequate marketing infrastructure and promotion.

Lack of experience

Many of the new entrants to the industry in the 1990s lacked business experience and had no training or experience of aquaculture. They had a poor understanding of the cash flow requirements of the business, and failed to allow properly in their plans for working capital requirements. This forced them into extended credit agreements with fry and feed suppliers.

Amongst the bigger operators, large sales teams with no experience of the sector were employed to try and sell large volumes of fish on overseas markets. This product push philosophy, with limited regard for delivering desired specifications, is especially risky and potentially damaging when launching a product to new consumers and markets.

Excess of fry

Two thirds of national fry production is in the hands of the larger stock market quoted companies. In order to boost profitability and appease investors at the height of the stock market boom in 1998-1999, these companies had to maximise production to boost sales and keep fry unit costs down. They therefore offered extended credit, typically until the fish reached market size, to farmers who in any case could not afford to pay

the hatcheries until they had sold the fish. Thus to a large extent the rapid rise in production from 2001-2002 was due initially to the drive to produce large volumes of fry by the big hatcheries.

The drive for economies of scale
As prices fell in the 1990s, the industry's response was to aim for greater economies of scale in the belief that lower production costs would help offset further falls in market price. Whilst production costs have certainly fallen, by the late 1990s they had already fallen to a point below which any significant further gains were possible. Thus hereafter, production increased and prices fell but production costs did not, putting increasing pressure on profit margins.

Poor industry administration by government
The government has been a willing partner in promoting the industry, through provision of grants alongside EU money, and favourable loans through government-backed banks. However, there has been no strategic industry planning and no enforcement of the conditions of farm licenses, which could have helped prevent the over-supply situation.

Lack of product promotion
Even during the boom times of the late 1990s, nobody in the industry had the foresight to start promoting the product. Even the large quoted companies with ample funds at that time failed in this respect.

Reliance on exports
80% of production in Greece is exported, placing heavy reliance on markets such as Italy, France, Spain and Portugal. The Greek product in these countries is seen as inferior to the home-produced product, not only because it takes longer to reach the market but because it lacks proper branding and traceability. During the time of the crisis, there were many exporters/agents, all effectively competing with each other, and this also helped to drive prices down. Many smaller fish found their way into supermarkets where they were promoted as 'sale' fish at low prices. In addition, the introduction of the Euro at this time helped to depress consumer demand generally throughout Europe.

Shortage of working capital resulting in early sales of small fish
Farms which had not made proper provision for working capital and were being put under pressure by creditors were forced to sell fish at the earliest possible opportunity, leading to an excess of smaller size grades on the market which then attract yet lower prices. These lower prices, of course, then tend to depress market prices further still.

Banking crisis
In the event of farmers not being able to pay for feed and fry, suppliers take possession of the fish and possibly even the farm; however as the banks lent money with fish as security and as they only rank second to other creditors, the fish belong to someone else and they are not able to recover their money. Although terms for bank lending have now been drastically revised, the lax terms of the 1990s provided by (government-backed) banks are now being addressed. This is one reason apparently why farm businesses cannot readily be wound up and thus eliminated from the industry – an ongoing source of concern for the sector.

In Greece, production is still dominated by small and medium producers, with only one third of total production in the hands of large vertically integrated companies with well organised marketing and distribution operations. Although there have already been some company failures, the industry view is that there is still a great deal of pain to be endured before it can attain an even footing again. It is anticipated that production in Greece will actually fall over the next 5 years, even in an optimistic scenario.

One of the most damaging impacts of the crisis for the Greek industry is the devaluation of the image and position of bass and bream in the minds of consumers, an impact from which it may be difficult to recover or alter.

5.3.2 Italy

From the price data available from the Italian Association of Pisciculturists (see Figure 39), the decline in price in Italy for Italian produced fish was not as severe as elsewhere, and in fact appeared to remain relatively high. This could well be due to the preference that Italian consumers have for home-produced fish, and the fact that such fish is sold through retail outlets at larger sizes, whereas the smaller imported fish from Greece goes into the catering sector at lower cost levels.

Italian farmers have also reacted to the pressure from Greek imports through product development: larger sizes, emphasis on freshness, gutted product in modified atmosphere packs, better packaging, labelling and emphasis on origin have all been adopted to help establish and retain competitive market positions.

5.3.3 Spain

Some of the factors applying to Greece also applied to Spain, especially inexperience and lack of capital among new industry entrants, who again put product on the market which was of small grade size and at the wrong time of the year. This is particularly the case with seabream, where some 40% of production in the period 2000-2002 was put on the market in the last quarter of the year (see Figure 17 of section 3.2.6). The situation was exacerbated by the arrival of Greek imports on the market at the same time, as clearly shown in Figure 37.

However the crisis has not led to significant farm closures and there have been few job losses. Most of the smaller farms have however looked to form larger groups or sold shares to investors. The main impact therefore has been integration, which will be to the long term benefit of the industry. Marketing is now carried out mainly by 4 large groups. The marketing of imported fish, which during the price crisis was conducted by around 40 sellers all competing aggressively to offer the lowest price, has now mostly been taken over by 4 of the largest Greek operations.

On the markets, the main impact has been a devaluation of the image of seabass and seabream, with smaller sizes in particular being seen as a 'sale' fish for consumption only when there are promotions. Recently fish of 200-300g have been sold on promotion at €0.99/fish. Spanish producers are aiming to differentiate their product from imports through production of larger sizes and emphasising the freshness of the domestic product compared with imports.

Spanish producers appear to be reasonably optimistic about their prospects over the coming 5 years, and with a growing domestic market and a perceived quality and distribution advantage over more distant Greek producers, they expect production to increase significantly.

5.3.4 Turkey

In Turkey the cause of its own internal crisis was not related to unregulated supply in Europe, but mainly to the Turkish economic and banking crisis of 2001 which hit all sectors of the economy. Producers, wholesalers and retailers all lost their liquidity, and it is estimated that around 30% of producers, mainly small scale farmers, went bankrupt or gave up production. Other factors in the crisis contained elements of unplanned and undisciplined expansion, lack of producer representation, and lack of product promotion.

Prices in 2003 were relatively good on the home market, and with the economy now more stable prospects look better.

5.3.5 France

The price decline in France was due to the oversupply of small fish from Greece and Turkey, which caused downward pressure on French-produced fish. The profits of French producers were badly hit, and in 2002 out of 15 farms, 7 recorded losses. It is thought unlikely that most producers could stand another period of low prices. However, the industry strategy to produce larger fish and to comply with quality schemes has generally been effective in protecting French producers from low cost imports.

5.4 Was the price crisis caused by over production ?

In answering this question it is first necessary to define "over production". In classical terms it is defined as being the point at which supply to the market exceeds demand such that equilibrium price falls to below the marginal cost of production. To further evaluate whether over production occurred it is thus necessary to look at production costs in all countries, and at the market prices achieved for the output from those countries. A great number of factors need to be taken into account, including seasonality of production, the species and size of fish produced, and the markets on which fish are sold.

A further important issue is whether over production is being evaluated on an EU basis or a country by country basis, for whilst conditions for overproduction might be present in some countries, they may not be in others. Furthermore, within any one country costs of production for different producers vary widely, as do market prices achieved, thus some farms may be operating profitably and therefore not technically contributing to overproduction, whilst others may be selling at a loss and thus "over producing".

The data required to make a detailed appraisal of this issue was not available during this study. However, certain observations can be made from data collected in certain countries (see Table 43). It should be emphasised that this data may contain certain flaws, and therefore should not be taken as conclusive. For example, production costs are notoriously hard to define accurately, and those given are representative of more efficient producers, not necessarily of the industry as a whole. In addition, the production costs given are for the more common sizes produced and do not reflect production of larger fish for which production costs are higher. Production costs for the industry as a whole might therefore be higher than those indicated. With regard to ex farm prices, these are often collected by government authorities and do not always reflect the true prices achieved by farmers – for example transport costs to market may not always have been deducted.

With the exception of Greece in 2002, the ex farm price of bass for the sizes in question appears to have been above cost of production. For bream, however, cost of production in Greece (2001-2003) and Spain (2002-2003) appears on average to have been above ex farm price. Thus it seems likely that overproduction of bream did occur in Greece and Spain in 2002 and 2003.

In Italy, and France, however, first sale prices appear to have been comfortably above production cost, even allowing for possible transport costs, perhaps reflecting the preference of domestic consumers for home produced fish. On the other hand, 7 out of 15 French farms in 2002 reported losses, suggesting that production costs were higher and/or prices lower than indicated in Table 43.

Table 43. Comparison of estimated production costs and ex farm prices

		Cost of production (€/kg ex farm)			Ex farm price (€/kg)			
	Species	Fish size	Range	Avg.	Fish size	2001	2002	2003
Greece	Bass	360g	3.53-4.36	3.94	300-450g	4.22	3.83	4.17
	Bream	360g	3.48-4.30	3.89	300-450g	3.66	3.56	3.66
Italy	Bass	350-400		4.27	all	6.26	6.40	
	Bream	350-400		4.27	all	5.42	5.60	
Spain	Bass	400g		4.28	400-600g	5.35	5.21	5.50
	Bream	400g		3.98	400-600g	4.21	3.85	3.94
France	Bass	350-400		4.20	500g	5.80	5.50	
	Bream	350-400		4.20	500g	5.64	5.85	

Note: ex farm prices for Italy and France are prices at first sale, and may include transport and other costs.

In conclusion, it appears evident that over production of some species in some countries at certain periods was at least partly responsible for the price crisis, in particular the production of bream in Greece and Spain.

5.5 Conclusion

The fundamental cause of the price crisis was an imbalance between supply and demand caused by rapidly rising and uncontrolled production without proper planning, market support or promotion. The situation was exacerbated by the intrinsic seasonality of bass and bream production which naturally tends to result in the largest volumes being harvested in the autumn when demand is falling. Over production appears to have been a major factor, especially of bream in Greece and Spain.

The production industry, especially in Greece, effectively expanded its ability to produce, whilst the market, although growing, was not able to keep pace. The impact of this imbalance between supply and demand in all countries was to reduce profitability and in many cases cause losses. Many, for the most part but not only, smaller farmers were either taken over or subsequently went out of business, and larger companies have

assumed greater prominence in the selling of fish. However, for the majority the industry is still dominated by small and medium producers and there is still much further scope for rationalisation.

In all cases there has been a combination of events which have caused various interactions on the markets supplied from different production regions. The deficiencies of co-ordination and timing between producers and buyers, combined with endogenous competitive pressures to expand international market shares, resulted in a less profitable sector and potentially adverse impact upon future market opportunities. Whilst country reports seem to place emphasis upon the absence of promotion, which may well be true, it would be interesting to speculate to what extent there is realisation of the more widespread deficiencies of the marketing function. Until many of the fundamental components of the marketing function are integrated within the production process, including throughout the supply chain, there must be a danger that the same cycle of crisis could be repeated again.

6 The use of FIFG funds for the further development of the bass and bream industry

Article 13 of Regulation 2792/1999 regarding FIFG funds states, among other things, that financial assistance from the FIFG may be granted only for projects which avoid counterproductive effects, particularly the risk of creating surplus production capacity.

Following the price crisis in 2001-2002, the European Commission considered that such a risk was present, and in autumn 2002 advised member states to suspend the use of funds for the creation of new production capacity. In view of the rapid expansion of the industry up to that time and the accompanying fall in prices to a level often below cost of production, especially for bream produced in Greece and Spain, this decision appears to have been justified. The Commission must now decide what action, if any, should be taken. The question of whether there is still a risk of creating surplus production capacity must again be addressed.

With regard to recent price trends in the industry, it appears that whilst prices improved slightly in 2003, they were still on average below cost of production for sea bream produced in Greece and Spain, sectors which together account for nearly 40% of all production of the combined total of bass and bream in all countries.

What however about likely future trends in demand and production for bass and bream, and the need for additional production capacity? Estimates for potential production by 2008 (see section 3.7.2) range between 220,000t and 283,000t on baseline and optimistic forecasts, from estimated production of 195,000t in 2003 (200,000t optimistically). However, in the short term, production is expected to fall to 185,000t in 2005 on baseline forecasts, as a result of continuing industry rationalisation in Greece. Even optimistically, production is expected to remain level for 2003-2004. Fish from the capture fishery of around 20,000t p.a. must also be added to estimates of aquaculture production to give a complete picture.

With regard to potential demand (see section 4.5.3), baseline and optimistic forecasts suggest demand is likely to remain flat until 2005 whilst industry rationalisation continues, prices stabilise, and market development plans have a chance to mature. By 2008, demand has the potential to increase to between 255,000t (baseline) to 322,000t (optimistic). The baseline forecast assumes only a limited impact from market development, continuing rationalisation, and no major reductions in production or selling cost. The optimistic forecast assumes that industry rationalisation has been largely completed, that there might be small but important reductions in production cost, and that market development efforts are more stringently and successfully pursued.

Taking into account the extent of industry crisis in Greece, the main producer and exporter, we consider that the baseline production and demand scenarios are the most likely to be realised, given the financial pressures on the industry and the limited resources available for market development. In the short term therefore, up until 2005 at least, there exists sufficient production capacity to meet demand, given that production is expected to fall. Beyond 2005, assuming an increase in demand and once production starts to rise above current levels, additional capacity will be found either through more efficient use of existing facilities or through investment in new capacity and infrastructure.

Therefore, in the short term (1-3 years) any measures to increase production capacity, in the absence of appropriate measures to stimulate demand, run the risk of again creating surplus capacity and putting further downward pressure on prices. FIFG funds might instead be better directed to market development initiatives, such as improved quality and channel infrastructure, new product development, promotion, and measures to reduce production cost. In addition, the evolution of the market should be continually monitored, and more effective planning and control of the development of the industry should be implemented.

7 Conclusions and recommendations

7.1 Conclusions

Production

The seabass and seabream production industry has come a long way since its beginnings in the early 1980s, and is now a relatively mature industry producing nearly 200,000 tonnes in 2003. Geographically it is a widely spread industry covering many different countries and utilising a variety of production systems. This amenity to production environments found in different countries suggests that there is always likely to be significant competition between international producers. The nature and size of companies involved in the sector range from small family owned farms producing less than 100 tonnes p.a. to large corporate entities quoted on stock markets producing over 10,000 tonnes p.a.. The industry within the EU has been strongly supported by EU structural funds and national government support programmes, and these have been particularly important in Greece in stimulating investment in the sector.

Greece has always been the dominant producer, and in 2002 the majority of production of both species (71%) was from Greece (57%) and Turkey (14%), with lesser amounts from Italy (10%) and Spain (8%). Among the major producers, growth in production over the past 5 years has been the most rapid in Spain. The relative production of seabass and seabream varies from country to country and from year to year depending on market demand and relative prices. In Greece and especially Spain, seabream has been the favoured production species, whereas in Turkey and Italy it has been more evenly balanced.

Capture fisheries production of seabass and seabream is an important component of overall supplies, amounting to between 16,000-20,000t p.a.. Typically wild fish fill a different market niche to the farmed product, and fetch a significantly higher price which has not been affected by the fall in farmed prices.

Production was constrained in the early days of the industry by the lack of good quality fry. Fry is now produced in large volumes at low cost, and there is sufficient potential hatchery capacity to support the industry for the foreseeable future. The main constraint now on the production side is the availability of suitable sites that provide adequate shelter and carrying capacity, do not conflict with other coastal uses such as tourism and shipping, and for which licenses can be obtained. Land based farms are an option and are still widely used especially in France, Portugal, and Italy, but production costs are generally higher and in the longer term it is doubtful if they will remain competitive.

The greatest scope for future production increases therefore is in the relatively sheltered coastal waters of Greece and Turkey, which offer a potentially plentiful supply of sites for low cost plastic cages. Production costs in these countries are already lower than elsewhere and are likely to remain so in the future. Turkey in particular has an advantage at present with low labour costs. Even in Greece and Turkey however, there are increasing constraints on the use of coastal sites, and although steps are being taken in Greece to implement a Coastal Zone Management plan that includes aquaculture, it is likely to become harder and harder to obtain licenses for sites. In Greece, obtaining permission for expansion of sites is also a major difficulty as local residents, more aware now of the potentially negative environmental impacts of aquaculture, offer greater opposition. Spain also has potential to produce more, and there is considered to be good scope in the warmer water of the Canaries where regional subsidies make up for the distance from markets. There is therefore scope to increase production subject to licensing constraints, and that production is most likely to come from low costs producers in Greece, Turkey and to a lesser extent Spain. The more traditional farmers in Spain, Portugal and Italy using pond based systems can also be expected to survive as niche players, capitalising on a product that can be promoted as being nearer to a wild fish than the cage farmed product.

Production costs have reduced about as far as is technically possible in the short term, to at best €3.50/kg ex farm for large vertically integrated operations. Fry, feed and labour on average make up 70% of costs. Turkey has an advantage with low cost of labour, but this is offset on export markets to some extent by higher transport costs and loss of shelf life in transit. In the longer term, selective breeding for better growth and later maturity, improved feed conversion, lower fry costs, and more efficient culture systems can be expected to gradually erode costs. The relatively high cost of production and slow growth of bass and bream are however negative attributes relative to other culture species that cannot be easily overcome.

The biological attributes of bass and bream also tend to promote a production cycle based on spring stocking followed by harvest in summer/autumn of the following year, with the bulk of harvesting taking place in the final quarter when demand is naturally falling. Holding fish over a second winter leads to maturity problems, loss of

weight, and extra cost, and most farmers try to reduce stocks before this time. A large part of the supply/demand imbalance on the markets can be attributed to this problem, strongly suggesting a need for more effective production planning, and in the longer term research into delaying or reducing the impacts of maturity.

The size grades of bass and bream have typically been in the range of 300-450g, but increasingly producers are aiming to differentiate their product through growing on to larger size which command better prices and are subject to less competition. Spain through warmer water sites in the Canaries sees great potential in this respect, but most other countries are also taking this approach. However, the cost of production of larger fish is significantly higher than for smaller fish, and it is likely that as production of larger sizes increases, market prices will come down, thus reducing the present apparent attraction of this approach.

The profitability of farms in all countries has fallen to an all time low, and in 2002 many farmers recorded losses. In Greece, the smaller farms have been the hardest hit, and with higher levels of debt than the larger quoted companies are expected to exit the industry or be absorbed by larger players. A similar trend has taken place in Spain. Although painful in the short term, this process of rationalisation is seen as essential if the industry is to develop further. Already in Spain sales are now in the hands of 4 large companies which allows for more professional and coordinated marketing; in addition, there are now only 4 Greek importers to Spain, whereas during the price crisis there were over 40, all competing with each other for sales.

This study has highlighted a major discrepancy between recorded and actual production in Greece, with actual production in 2002 estimated to have been over 100,000t compared with 70,000t by FGM/FEAP and government sources. This has created confusion in the industry as a whole, and is evidence of a "head in the sand approach" to industry monitoring, planning and enforcement by the government and industry alike. This under declaration of production seems to be closely tied in to the difficulty most farms in Greece have in expanding their license capacity, often due to local opposition. Steps are being taken to move the licensing process from prefectural to regional level and this should help to neutralise the impact of local politics. Firm steps need to be taken however to bring more discipline to the monitoring of real production and the enforcement of licence conditions. It is essential that real production levels are known to allow effective management of the industry.

Two forecasts of production have been made, a baseline forecast based on cautious assumptions, and an optimistic forecast assuming the most favourable conditions for development. The baseline forecast, which is considered to be the most likely in practice, anticipates that production will fall in the short term due to the effects of industry rationalisation especially in Greece, from around 195,000t in 2003 to 185,000t in 2005. It is then expected to recover to around 220,000t by 2008. The optimistic forecast anticipates production staying the same for 2003-2004, and then rising to around 280,000t in 2008. It must be emphasised however that such growth would depend very heavily on first creating sufficient demand through market development, and through the resolution of the difficulties faced by the industry in obtaining ongrowing site licences.

The price crisis

The cause of the so called "price crisis" of 2001-2002 was a rapid rise in production especially in Greece which overtook market demand. The problem was exacerbated by the high rate of Greek exports onto the Italian and Spanish markets during the peak autumn harvesting periods when demand was naturally falling. In addition, the average size of fish sold was of smaller grades due to financial pressures on some farmers to raise cash. The undisciplined selling of Greek fish on export markets was a result of weaknesses in the way the industry had developed up to that point: ready availability of grants and loans encouraged inexperienced operators to start farms with little of their own money, eventually leading to cash flow problems and early selling; the push by quoted companies to sell large volumes of fry to boost financial results, often on long term credit to aforementioned inexperienced operators; and a complete lack of product promotion and over reliance on exports. Over production appears to have been a major feature of the price crisis, especially of bream in Greece and Spain.

The impact of the imbalance between supply and demand in all countries was to reduce profitability and in many cases cause losses. Many smaller farmers were either taken over or subsequently went out of business, and larger companies have assumed greater prominence in the selling of fish. However, for the most part the industry is still dominated by small and medium producers and there is still much further scope for rationalisation.

International trade

The over riding pattern of international trade is the majority of exports coming from Greece and supplying the largest markets in Italy, Spain and Portugal. France, UK, Switzerland and Germany all import lower volumes

but are growing in importance. Within this overall scenario, there are lesser trading patterns between neighbouring countries, for example the export of seabream from Spain to Portugal.

The often quoted threat of cheap Turkish imports into the EU does not appear to be borne out in practice: Turkey consumes most of its bream on the home market, and its seabass exports in 2002 only accounted for 6% of the overall market, compared with 45% from Greece. Moreover the distance and current distribution channels from Turkey would seem to render any threat less potent.

Consumption

Italy is the largest market for seabass with apparent consumption of 42,000t in 2002 (46% of total), and has the highest per capita consumption at 0.74kg. Greece has the second highest per capita consumption at 0.49kg, despite the fact that seabass is generally not favoured by the home market.

Spain has the largest market for seabream at around 26,500t in 2002(25% share), with per capita consumption of 0.66kg. Italy closely follows Spain with a market of around 24,000t (22% share) and per capita consumption of 0.4kg. Greece however has by far the highest per capita consumption of seabream at 1.6kg.

Consumption in the relatively mature Italian market was relatively slow over the period 1998-2002 (30% increase), with growth in demand apparently being mainly for bass. Consumption in France grew by around 70%, with greater demand for bream.

In contrast, consumption in the Iberian peninsula countries of Spain and Portugal has risen very rapidly, by 400% and 350% respectively.

Consumption in Turkey rose between 1998 and 2002, but then fell back to 1998 levels in 2002 due to the impact of the internal economic crisis.

Consumption in emerging markets such as the UK, Germany and Switzerland is growing in importance, and is likely to show steady further growth. These countries have evidenced a demand and willingness to pay higher prices where consumers perceive commensurate increments in the product values delivered.

Consumption in other N European countries such as Belgium and Netherlands and the Scandinavian countries is very low and largely confined to the restaurant sector. The main limiting factor is the relatively high price of seabass and seabream, lack of species knowledge, and the presence of high quality substitutes produced locally. Whilst it seems unlikely that there will be any major change in consumption over the next five years, there may still be opportunities to penetrate these markets with improved marketing initiatives.

Market characteristics

The market may be broadly segmented in two principal areas: foodservice (or catering) which embraces profit and cost sectors providing for consumption away from the household and the retail sector from which purchases are normally made for preparation and consumption within the household.

Multiple retailer chains or supermarkets increasingly dominate the retail market in all countries studied, with the market share of specialist fishmongers and street markets decreasing. With some upmarket exceptions, price is commonly critical to the retailer and high volumes of seabass and seabream are often sold through low price promotional campaigns. In some countries, including Spain and Germany, this has led the species to be perceived as a 'sales' fish and negative associations are thus established which can impact on the opportunities to reposition the product.

The catering markets are of particular importance in Spain and Italy, where there is a strong tradition of eating out at weekday lunchtimes. This market is also price sensitive, and buyers switch to other products if prices rise above a certain ceiling. Increasingly this segment of the market is met by cheap Greek imports which also fulfil the relatively small portion size requirements. However catering markets do contain a variety of different quality levels and it should be recognised that within some sectors at least premium prices will be paid for superior quality product.

A particular feature of all markets studied is the expressed preference of consumers for locally grown products over imports. The image of local products is enhanced through quality assurance schemes such as in France, or by promotion of a 'near nature' image as with fish from valliculture in Italy. In addition, further differentiation is achieved through production of larger sizes. Imports are commonly unbranded and quality can be variable owing to long transit times. Even where country of origin is communicated at the point of sale, there is often little effort to build positively upon that proposition. Quality, in terms of freshness and size grading, and traceability are often poor owing to the practice of pooling fish at distribution centres outwith the country of

origin. It is clear that imports from Greece especially face an uphill battle in achieving greater acceptance especially at the higher end of the market.

New product development

Seabass and seabream are still almost universally sold as whole fish. This is in large part a reflection of traditional Mediterranean markets which favour this product form; it would appear that product-centred thinking has failed to embrace the concept of delivering what the market wants, in some cases at least. Despite the potential preferences of some of the newer markets, whole, head-on fish have important roles to play and it is likely that many market sectors will continue to exhibit this preference for the foreseeable future.

However, as one moves away from regions bordering the Mediterranean, perhaps reflecting higher income levels and greater consumer expectations, there is an increasing demand and willingness to pay for value added product forms even if this only implies a branded quality assured whole product or a gutted pre-packed one. In France, much farmed product is quality assured, and attracts a high degree of customer loyalty compared with imported fish which are seen as being of inferior quality.

In Italy pilot new product developments have been made for seabass and seabream on the back of already established products for cultured rainbow trout. Producers are starting to diversify into filleted and gutted products and are taking steps to modernise plants and improve labelling and packaging. In addition many producers are now beginning to recognise the scope to add value through improvements in product quality, hygiene, environmental growing conditions and indications of species origin.

New product forms include pre-packed fresh fish fillets, sushi portions, fresh marinated portions and ready-prepared meal accompaniments such as the oven-ready stuffed bass trialled in the UK market. One has only to consider the wider permutations that permeate other product ranges to appreciate the potential scope for yet further expansion.

Nonetheless, seabass and seabream do have some inherent disadvantages for product development compared with other cultured species such as salmon. Most notable is the high cost of production and small harvest size. This is likely to mean that new product forms are, initially at least, based on more limited whole fish transformation as discussed above, rather than filleted products which have to compete with other well established white fish products produced at significantly lower cost. Against this though is the opportunity to promote the seabass and seabream in discrete higher price positions because they are often new to the consumer.

Distribution

There is undoubtedly significant scope for improvement in distribution, especially with regard to reducing journey times which at present may be extended through product having to pass through transport hubs. Hitherto much of the emphasis in distributing seabass and seabream product seems to have been based on simply transportation between points of production and consumption with little regard for the interim impact on quality. In order to compete with other food products controlled temperature chains, verifiable logs of journeys and robust delivery schedules *inter alia* are of paramount importance.

Logistics networks are increasingly complex and particularly within the supermarket sector are seen as an integral part of the retail environment and indeed the very product purchased and consumed. Similarly at wholesale markets and other points of exchange within the chain it is vital that the delivery and handling of the product conveys all the signals that are appropriate to the end proposition. There is considerable scope and necessity to improve in this aspect of the industry.

Promotion

Currently there is a widespread concern at the perceived lack of product promotion, especially of Greek product on export markets. A 4-year programme of generic promotion funded by the EU and the Greek government has been agreed and is expected to start in 2004. Whilst promotion may, amongst other objectives, help promote awareness, it should be recognised that promotion of a product which currently does not consistently deliver expectations may be counterproductive.

Whilst there have been positive moves to implement a quality scheme in Greece, it should be emphasised that until this is firmly in place any promotional activity should be carefully targeted at those sectors of the market chain where good product quality standards are capable of reliable delivery. To do otherwise carries the very real likelihood of creating, possibly reinforcing, negative perceptions of the product ahead of its full potential being realised.

Forecast market demand
Two forecasts of demand have been made, baseline and optimistic. Both forecasts assume demand remains relatively flat over the period to 2005, whilst industry rationalisation occurs, prices stabilise, and market development plans are made. From 2005 the baseline forecast anticipates that demand could rise to around 255,000t by 2008, assuming that there is only a limited impact from market development initiatives, and production costs remain the same.

The optimistic forecast suggests that demand could increase to 322,000t by 2008, assuming that industry rationalisation has largely been completed, and that market development efforts are much more stringently and successfully pursued.

The use of FIFG funds for the further development of the industry
In autumn 2002 the EC invited member states to suspend all financing of projects which might entail a risk of creating surplus production capacity for seabass and seabream, on the basis that prices had fallen, for some of the time at least, to below cost of production, and there was therefore such a risk. Although prices improved slightly in 2003, there is still evidence of over production, particularly of bream in Greece and Spain, and many companies still face the prospect of financial loss. In the short term (up until 2005 at least) demand is expected to remain flat and production, according to the most likely baseline forecast, is expected to fall.

Therefore, in the short term (1-3 years) any measures to increase production capacity, in the absence of appropriate measures to stimulate demand, run the risk of again creating surplus capacity and putting further downward pressure on prices. FIFG funds might instead be better directed to market development initiatives, such as improved quality and channel infrastructure, new product development, promotion, and measures to reduce production cost. In addition, the evolution of the market should be continually monitored, and more effective planning and control of the development of the industry should be implemented.

7.2 Recommendations

- The development of national aquaculture plans and coastal zone management plans that include aquaculture should be encouraged and supported.
- Systems for site licence applications for aquaculture should be standardised and simplified throughout the EU.
- A more effective means of recording production needs to be implemented in all countries but especially in Greece, together with a better system of administering and enforcing licence conditions. This is a pre-requisite for more effective management of the industry.
- The present practice of autumn harvesting on a falling market should be discouraged through better production planning and R & D into finding ways of delaying and preventing maturity, as has been achieved elsewhere.
- The use of EU structural support for the industry should be reviewed. In the short term funds should be mainly directed towards market development initiatives, such as improved quality and channel infrastructure, new product development, promotion, and measures to reduce production cost. In addition, the evolution of the market should be continually monitored, and more effective planning and control of the development of the industry should be implemented.
- Support for R & D should be strengthened, with particular emphasis on reducing production costs, benefiting the environment and development of new technologies for new species and systems.
- The design, implementation, management and monitoring of quality schemes should be encouraged and supported as an integral part of the enhanced marketing function.
- Greater cooperation between producers, both nationally and internationally, should be encouraged, not only in the sharing of production and marketing information but also throughout the stages of market planning and execution of promotional activities.
- Industry producers should be encouraged to engage with other members of the supply chain, not least in the market, to improve market intelligence and assist in the delivery of products required.

- New product development of bass and bream product should be directed towards attributes such as freshness, identity of origin, full traceability, natural image, environmentally friendly, apposite pricing, contemporary packaging, and those other products as deemed desirable through the market research process.

- New product development should be undertaken with a market focus rather than the product-led preconceptions that currently dominate. Screening should incorporate the fullest range of whole fish, gutted, headless, filleted and otherwise transformed products as befits the current aquatic food market and apposite marketing supports should be enacted.

- Whilst emerging markets in N Europe eg Scandinavia may have scope in the long term and will naturally be explored by producers as the industry develops, market entry strategies should seek to capitalise on any comparative USPs and infrastructure support rather naively depending upon promotional spend alone.

- The greatest emphasis should be placed in the short term in improving existing distribution and marketing channel infrastructures to the main markets of Italy, Spain, Portugal and France, and to a lesser extent Germany and the UK.

- The development of marketing organisations or commercial groups that could embrace and support smaller producers under their aegis should be encouraged as a way of consolidating sales and providing better scope for negotiation with large customers such as multiple retailers. As a key component of such co-operation, the opportunities to adopt and utilise marketing information systems should be supported and developed.

- Any promotion undertaken by the industry should be founded on sound marketing principles, whereby the product is first of all developed to a point where the promoted attributes can be assured and sustained.

- The use of Producer Organisations as a means of controlling production may be attractive in theory, but they were originally intended for the management of capture fisheries and are not best suited to aquaculture production. Scope may exist as a means of encouraging more orderly production and marketing, especially in large producer countries such as Greece. Consideration might also be given to their possible role in promoting the regional identity of product.