

**DEFINITION OF DATA COLLECTION
NEEDS FOR AQUACULTURE**

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Part 3.

ANNEXES

TABLE OF CONTENTS

ANNEX 1.	MAIN INCATORS ON AQUACULTURE IN OTHER MEMBER STATES	3
ANNEX 2.	DEFINITION OF AQUACULTURE AND ON-GROWING TECHNIQUES.....	12
ANNEX 3.	DEFINITION OF A STATISTICAL UNIT	13
ANNEX 4.	CLASSIFICATION RULES OF STATISTICAL UNITS	14
ANNEX 5.	DEFINITION OF ECONOMIC INDICATORS.....	15
ANNEX 6.	CODE OF BEST PRACTICE	21
ANNEX 7.	TERMS OF REFERENCE OF THE STUDY	27
ANNEX 8.	LIST OF ABBREVIATIONS.....	28
ANNEX 9.	SUMMARY OF SWOT ANALYSES OF AQUACULTURE IN THE NATIONAL STRATEGIC PLANS	29
ANNEX 10.	SUMMARY OF THE LITERATURE SURVEY BY COUNTRY	41

ANNEX 1. MAIN INCATORS ON AQUACULTURE IN OTHER MEMBER STATES

AUSTRIA

Austria has a small fish farming sector, which produced in 2006 about 2,500 tonnes of fresh-water fish, with a total value of almost 12.3 million Euro. Trout (mostly rainbow trout) accounts for about 80% of the production volume and value. Second most important species is (common) carp, with a share of 12% in volume and 8% in value. Small quantities of other species are also produced – salmon, char, catfish, etc.. However, the volumes mostly do not exceed 2-5 tonnes per year.

Between 1999 and 2005 the production volume has decreased from 3,100 to 2,500 tonnes (by 20%). The total production value has fluctuated between 8-12 million euro.. The carp production has been steadily declining from 810 tonnes in 1996 to about 300 tonnes in 2006. The trout production has declined by about 15% between 1999 and 2006. The value of trout production has remained rather constant, fluctuating between 9 and 10 million Euro. Revenues from carp decreased by about 45%.

Approximately 2,500 tonnes is destined for consumption. Some 8-900 tonnes are destined for restocking of natural waters.

The SWOT analysis¹ highlight the following aspects of the Austrian fish farming:

- Strength: product quality, environmental production, family business, link with tourism and high and increasing professional level (education).
- Weaknesses: low competitiveness (legal requirements) .
- Opportunities: processing and marketing of high quality fish, introduction of new technologies and prevention of epidemics.
- Threats: complexity and profitability of investments in new technologies

Statistical tables

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	2.9	8.2		
1997	3.0	10.1		
1998	2.9	10.5		
1999	3.1	10.5		
2000	2.8	12.9		
2001	2.4	12.2		
2002	2.3	11.5		
2003	2.2	9.1		500 ²⁾
2004	2.3	8.2	371 ³⁾	
2005	2.4	8.5	400 ¹⁾	
2006	2.5	12.3		

Sources : Value and volume – FAO - FishStat

¹⁾Personal communication from Statistics Austria. At least 50% of these firms do not produce more than 1 ton / year;

²⁾ LEI / Framian 2004; ³⁾ Austria – EFF National Strategic Plan

¹ EFF National Strategic Plan, p.12.

Table 2. Review by sub-sector and species (value and volume), 2006

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Freshwater fish culture					
- Carp	0.4	1.2	400		500
- Trout	2.0	10.4			
- Other (catfish, char, salmon)	0.2	0.7			
Other					
- Hatcheries / Nurseries	800				

BELGIUM

Belgium has a small fish farming sector, which produced in 2006 about 1,200 tonnes of freshwater fish, with a total value of about 3.5 million Euro. Rainbow trout, common carp and to lesser extent African catfish are the three most important species. A small quantity of tilapia is also produced. However, these are only very rough estimates by FAO. The EFF National Strategic Plan estimates the aquaculture production at 2,300 tonnes at a value of 3.7 million Euro.

According to FAO, between 1996 and 2006 the production volume has increased first from 900 tonnes to almost 1,900 tonnes in 2000 (and falls subsequently back to 1,200 tonnes). The total production value has followed a similar pattern. In this period farming of European eel and sea trout has come to an end.

The SWOT analysis in the Belgian NSP characterizes the fish farming as follows:

- Strengths: positive image, strong know-how in research, protected marine areas guarantee water quality.
- Weaknesses: high production costs, lack of energy sources, coast is not suitable for delimitation of mariculture areas, discharging of nutrients from carp and trout farming, etc.
- Opportunities: progress in fish farming technologies and genetics, new project for farming of mussels and sole, farming inside windmill parks at sea.
- Threats: uncertain profitability in relation to required investments, cheap imports, environmental requirements (e.g. in relation to water discharge), water quality close to coast.

Statistical tables

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	0.9	3.7		
1997	0.8	3.4		
1998	0.8	3.4		
1999	1.6	5.0		
2000	1.9	6.6		
2001	1.6	6.0		
2002	1.0	3.0		84 ²⁾
2003	1.2	2.8		137 ¹⁾
2004	1.2	2.7		
2005	1.2	2.7		
2006	1.2	2.7	60-70 ³⁾	

Source: FAO

¹⁾NSP, p.12, ²⁾ LEI / Framian (2004); ³⁾ Estimate based on table 2.

Table 2. Review by sub-sector and species (value and volume), 2006

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Freshwater fish culture					
- Common carp	0.4	0.7			140 ²⁾
- Rainbow trout ¹⁾	0.4	0.9	60		
- North African catfish	0.3	0.6			
- Tilapias nei	0.2	0.5			

Source: FAO

¹⁾NSP put the production of trout at 1,500 tonnes and 2.5 million Euro. ²⁾ Estimate based on table 1.

Note:

Belgium has not collected new data since 2005 (data 2004). New survey is being prepared and new data may become available at the end of 2008.

CYPRUS

Cyprus reported in 2007 production of about 1000 tonnes of tuna (fattening), 1,400 tonnes of seabream, about 700 tonnes of seabass and small quantities of shrimp and trout.

Statistical tables

Table 1b. National overview – fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	0.8	5.9		
1997	1.0	7.2		
1998	1.2	8.0		
1999	1.4	9.0		
2000	1.9	11.2		
2001	1.9	10.6		
2002	1.9	11.1		
2003	1.8	10.4		
2004	2.4	15.1		
2005	2.3	14.2		
2006	3.6	14.8		
2007	3.2	15.3		

Source: Eurostat

Table 2. Review by sub-sector and species (value and volume), 2007

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Saltwater fish culture					
- Tuna	940				
- Seabass / Seabream	2,140				
- Other (shrimp, trout)	60				

Source: Eurostat

ESTONIA

Estonia has a small fish farming sector, which produced in 2006 about 700 tonnes of freshwater fish, with a total value of 2.7 million Euro. Trout (mostly rainbow trout) accounts for about 70% of the production volume and value. Common carp and European eel are produced in small quantities (about 40-50 tonnes).

Between 1999 and 2005 the production volume has fluctuated between 250 and 550 tonnes and the value between 0.5 and 1.4 million Euro. 2005 was a particularly good year with a production value of 2.6 million Euro.

The SWOT analysis in the Estonian NSP characterizes the fish farming as follows:

- **Strength:** Existence of natural resources, water and fishery resources; Clean and versatile nature; Stable macroeconomic environment (trade relations with foreign countries); Market demand and export potential for fish; Availability of a technical basis for supervision (Veterinary and Food Board, Environmental Inspectorate)
- **Weaknesses:** Significant shortcomings in the vocational training; Problems with accessing capital for small businesses and consequently low investment level; Insufficient long-term competitiveness of enterprises: low added value, insufficient usage of quality standards, low expenditure on innovation, weak marketing; Weak socio-economic development of rural areas; Underdeveloped infrastructure; Dependence of fish farms on imported juveniles and roe due to the absence of centers for breeding.
- **Opportunities:** Higher market price for inland water fish; High level of domestic demand for fishery and aquaculture products exceeding current production; Diversification of aquaculture species and favourable natural conditions; Increased demand for economic activities based on natural environment and cultural heritage (nature and culture tourism) contributing to the stabilisation of workforce in fisheries regions; Maintaining and improving environmental conditions by favouring environmental investment; Developing human capital (EU educational cooperation, virtual learning of international scope, in-service training and retraining)
- **Threats:** International competition; Environmental pollution; Decreasing quality of water bodies; Increasingly strict environmental, hygiene, safety, etc. requirements; Deterioration of conditions in natural habitats; Increased complexity/scope of administration schemes resulting in increased costs (in the context of a limited state budget)

Statistical tables

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	0.3	0.6		
1997	0.3	0.6		
1998	0.3	0.7		
1999	0.2	0.5		
2000	0.2	0.6		
2001	0.5	1.5		
2002	0.4	1.2		
2003	0.3	0.6		100 ²⁾
2004	0.6	2.1		
2005	0.7	2.7	35 ¹⁾	70 ³⁾
2006	0.7	2.7	26 ²⁾	

Sources: Volume and value – FAO, Fishstat; Employment and number of companies - Ministry of Agriculture, Fisheries Department; ¹⁾35 firms are active. Further 53 firms are registered, but either not active or not providing any information on their activities; ²⁾ NSP p.16-17. ³⁾

Table 1d. National overview – Nurseries and hatcheries

	Volume of production (million juveniles)	Value of production (million Euro)	Number of companies	Employment
2004				
2005			7	26
2006				

Source: Personal communication, Ministry of Agriculture, Fisheries Department

Table 2. Review by sub-sector and species (value and volume), 2006

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Freshwater fish culture					
- Common carp	0.1	0.2	26		70
- Rainbow trout	0.5	1.9			
- Other	0.1	0.6			
Other					
- Hatcheries			7		26

Sources: FAO – Fishstat (Volume and value); Ministry of Agriculture

LATVIA

Latvian fish farming sector produced in 2006 about 600 tonnes of freshwater fish, with a total value of about 1 million Euro. Common carp accounted for 83% of the production volume and 72% of the value. Other species are produced in very small quantities of several tonnes per year only.

The output of the sector has gradually increased over the past decade.

The SWOT analysis in the Latvian NSP characterizes the fish farming as follows:

- Strengths: government support for stocking, biological management and education
- Weaknesses: small and fragmented sector, insufficient marketing, processing and infrastructure, losses by wild predators,
- Opportunities: good quality of inland waters, no production restrictions, availability of manpower and knowledge (can be internationally acquired), protection of natural environments through the National Restocking Programme.
- Threats: climatic conditions are not optimal, likely deterioration of water quality due to economic development.

Statistical tables

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	0.4	0.5		
1997	0.3	0.5		
1998	0.4	0.5		
1999	0.5	0.6		
2000	0.3	0.4		
2001	0.5	0.7		
2002	0.6	0.7		426 ¹⁾
2003	0.5	0.4		
2004	0.5	0.7		
2005	0.6	1.1	98	336
2006	0.6	1.1		

Source: FAO Fishstat (value and volume), NSP

¹⁾ LEI / Framian (2004)

Table 2. Review by sub-sector and species (value and volume), 2006

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Freshwater fish culture					
- Carp	0.5	0.8	98		336
- Trout					
- Other	0.1	0.3			

Sources: FAO - Fishstat

LUXEMBURG

FAO and Eurostat do not have any data on Luxembourg.

MALTA

Two species are being cultured in Malta – European seabass and gilthead seabream. The total production amounted in 2006 to 1,100 tonnes with a total value of 6.2 million Euro. Between 1996 and 2005 the volume and the value of the production have been reduced by about 50%, but a recovery has been achieved in 2006.

In addition to fish farming, Malta has four firms dedicated to fattening of tuna. Their production amounted in 2005 to 3,000 tonnes with a total value of 34.3 million Euro.²

The SWOT analysis in the Maltese NSP characterizes the fish farming as follows:

- Strengths: good geographical location in relation to tuna migration.
- Weaknesses: Maastricht requirements on public finances imply that budget available for fisheries is limited, small size of the sector prevents achieving economies of scale, limited areas suitable for location of fish farms, high costs of imported materials.
- Opportunities: Relocation of installations further off-shore will increase available space and production.
- Threats: Crowding in seas around Malta – competition for space and consequent pollution, global warming affects feasibility of tuna fattening project.

Statistical tables

Table 1a. National overview – marine fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	1.6	8.0		
1997	1.8	9.1		
1998	2.0	9.4		
1999	2.0	8.0		
2000	1.7	5.4		
2001	1.2	3.4		
2002	0.9	4.0		105 ¹⁾
2003	0.9	5.1		
2004	0.7	4.2		
2005	1.1	6.2		
2006	1.1	6.2		84 FTE + 22 seasonal ²⁾

Source: FAO Fishstat; ¹⁾LEI / Framian (2004), ²⁾ NSP

² NSP

Table 2. Review by sub-sector and species (value and volume), 2005

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Mariculture (marine fish)					
- Seabream	0.9	4.3			
- Seabass	0.2	1.5			
- Other	0.0	0.5			

Source: FAO Fishstat

SLOVAKIA

In the past 10 years Slovakian aquaculture production oscillated around 1,000 tonnes valued between about 1.5 and 2.5 million Euro.

The SWOT analysis in the Slovak NSP characterizes the fish farming as follows:

- **Strengths:** Use of the restocking material only from licensed farms, territory is free of infections, multifunctional utilization of fish farming facilities, sufficiency of processing capacities complying with the current EU standards.
- **Weaknesses:** Stagnating production system of farms as a result of deteriorating infrastructure and technological equipment and increasing siltation of water areas used for fish farming, Absence of IT (hardware, software) needed to keep zootechnic records; Unresolved ownership relations of plots under the water areas used for fish farming; Lack of financial resources; Insufficient interconnection between research and practice; Absence of life-long learning; Poor promotion of aquaculture products; Thin assortment of products. Usual problems of micro enterprises.
- **Opportunities:** Strengthening of genetic resources; Introduction of new species; Integration with tourism; Direct sale at the farm; Processing of new species; Healthy food-stuff.
- **Threats:** Damages by protected predators; Increased costs resulting from NATURA 2000; insufficient research; Charges for water inlet for the fish farmers as part of the implementation of the EU Water Framework Directive and integrated river-basin management; Low state support; new diseases; low fish consumption; competition from cheap imports

Statistical tables

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	1.0	1.6		
1997	1.3	2.5		
1998	0.6	1.3		
1999	0.9	1.8		
2000	0.9	2.0		
2001	1.0	2.4		
2002	0.9	1.7		233 ¹⁾
2003	1.2	2.1		
2004	1.0	1.7		
2005	1.3	2.1		
2006	1.3	2.1		

Source: FAO Fishstat, ²⁾ LEI / Framian, employment in the fisheries sector: current situation.

Table 2. Review by sub-sector and species (value and volume), 2005

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Freshwater fish culture					
- Carp	0.2	0.4			
- Trout	0.8	1.7			
- Other					

Source: FAO Fishstat

SLOVENIA

Slovenian aquaculture production amounted in 2006 to about 1,600 tonnes with an estimated value of about 3.2 million Euro. The sector employs about 500 persons³, of whom about 60% on part time basis. The volume of freshwater output is gradually increasing, while the other sectors seem to stagnate.

The SWOT analysis in the Slovenian NSP characterizes the fish farming as follows:

- **Strengths:** Good quality and abundance of the inland waters; Breeding of different fish species – indigenous and non-indigenous; Existence of selling and processing in fish farms; Continuity of quality and supply to the market; Controlled fish breeding in fish farms enables complete traceability; Good interconnection of aquaculture and recreational fisheries (for e.g. restocking).
- **Weaknesses:** Obsolete infrastructure; Low fish; Small production units; Poor recognition of Slovenian fish and bivalve molluscs; Damages by predators; Very vulnerable marine environment; High cost of the labour; Insufficient cohesion of the sector; Insufficient professional education; Difficult control over fish diseases in fish farms built on open waters; International competition.
- **Opportunities:** Possibilities to increase production; Breeding of new fish species; Bigger interconnection of the sector; Promotion; Introduction to new sales techniques; New technologies (recycling/water purification systems); Favourable influence of extensive carp ponds breeding systems on water regime; Possibility of shifting to organic and environment-friendly aquaculture production.
- **Threats:** International competition; Environmental pollution; Endangered water habitats; Global warming; Occurrence of new diseases; Negative publicity; Tension of the environmental legislation

Statistical tables

Table 1a. National overview – marine fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment ¹⁾
1996	0.1	0.0		16
1997	0.0	0.0		18
1998	0.0	0.1		17
1999	0.0	0.0		19
2000	0.0	0.1		11
2001	0.1	0.2		10
2002	0.1	0.1		17
2003	0.2	0.1		12
2004	0.2	0.2		12
2005	0.2	0.1		17
2006	0.2	0.1		22

Source: FAO Fishstat

¹⁾ Statistics Slovenia, Personal communication

³ Including an estimated 50 persons in shellfish farming.

Table 1b. National overview – freshwater fish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies ¹⁾	Employment ¹⁾
1996	0.7	2.4	42	129
1997	0.8	2.4	39	129
1998	0.8	2.4	80	159
1999	1.1	3.6	84	164
2000	1.1	3.3	79	204
2001	1.1	3.3	104	205
2002	1.1	2.9	93	228
2003	1.3	3.2	101	242
2004	1.1	2.5	95	241
2005	1.2	2.6	90	223
2006	0.7	2.4	85	201

Source: FAO Fishstat

¹⁾ Statistics Slovenia, Personal communication

Table 1c. National overview – shellfish farming

	Volume of production (1000 t)	Value of production (million Euro)	Number of companies	Employment
1996	0.1	0.0		
1997	0.0	0.0		
1998	0.0	0.1		
1999	0.0	0.0		
2000	0.0	0.1		
2001	0.1	0.2		
2002	0.1	0.1		
2003	0.2	0.1		
2004	0.2	0.2		
2005	0.2	0.1		
2006	0.1	0.0		

Source: FAO Fishstat

Table 2. Review by sub-sector and species (value and volume), 2005

	Volume (1000 t)	Value (million Euro)	Number of companies	Types of on- growing unit	Employ- ment
Mariculture (marine fish)					
- Seabass / seabream	0.0	0.2			
Freshwater fish culture					
- Carp	0.2	0.7		Ponds	
- Trout	1.0	2.8		Tanks	
- Other (specify)	0.1	0.2			
Molluscs and crustaceans					
- Mussels	0.2	0.2			

ANNEX 2. DEFINITION OF AQUACULTURE AND ON-GROWING TECHNIQUES

Sources: EC Reg 1198/2006 and 762/2008

Definition of aquaculture

the rearing or cultivation of aquatic organisms using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment; the organisms remain the property of a natural or legal person throughout the rearing or culture stage, up to and including harvesting;

Definition of environments

Freshwater means water which has a constantly negligible salinity.

Saltwater means water where the salinity is appreciable. This may be water where the salinity is constantly high (e.g. sea water) or where the salinity is appreciable but not at a constantly high level (e.g. brackish water): the salinity may be subject to periodic variation due to the influx of fresh or sea waters.

On-growing techniques - fish

Ponds means relatively shallow and usually small bodies of still water or water with a low refreshment rate, most frequently artificially formed, but can also apply to natural pools, tarns, meres or small lakes.

Enclosures and pens means areas of water confined by nets, mesh and other barriers allowing uncontrolled water interchange and distinguished by the fact that enclosures occupy the full water column between substrate and surface; pens and enclosures generally enclose a relatively large volume of water.

Cages means open or covered enclosed structures constructed with net, mesh or any porous material allowing natural water interchange. These structures may be floating, suspended or fixed to the substrate but still permitting water interchange from below.

Tanks and Raceways means artificial units constructed above or below ground level capable of high rates of water interchange or with a high water turnover rate and highly controlled environment but without water recirculation.

Recirculation systems means systems where the water is re-used after some form of treatment (e.g. filtering).

Hatcheries and nurseries means places for the artificial breeding, hatching and rearing through the early life stages of aquatic animals. For statistical purposes, hatcheries are limited to the production of fertilised eggs. [...] First juvenile stages of aquatic animals are considered being produced in nurseries.

On-growing techniques – shellfish

On bottom
Off bottom

ANNEX 3. DEFINITION OF A STATISTICAL UNIT

SOURCE: COUNCIL REGULATION (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community, consolidated version published 20.11.2003

The following definition is suitable for the purposes of the present study as this definition is also used by the Standard Business Statistics (SBS), definitions of which are also used in the present study.

Enterprise

The *enterprise* is the smallest combination of legal units that is an organizational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit.

Explanatory note

The enterprise thus defined is an economic entity which can therefore, under certain circumstances, correspond to a grouping of several legal units. Some legal units, in fact, perform activities exclusively for other legal units and their existence can only be explained by administrative factors (e. g. tax reasons), without them being of any economic significance. A large proportion of the legal units with no persons employed also belongs to this category. In many cases, the activities of these legal units should be seen as ancillary activities of the parent legal unit they serve, to which they belong and to which they must be attached to form an enterprise used for economic analysis.

ANNEX 4. CLASSIFICATION RULES OF STATISTICAL UNITS

Source: COUNCIL REGULATION (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community (consolidated version of 20.11.2003)

C. Activity criteria

1. The economic activity of production — hereinafter referred to as ‘activity’ — can be said to take place when resources such as equipment, labour, manufacturing techniques, information networks or products are combined, leading to the creation of specific goods or services. An activity is characterized by an input of products (goods or services), a production process and an output of products.
2. Activities are determined by reference to a specific level of NACE Rev. 1.
3. If a unit carries out more than one activity, all the activities which are not ancillary activities are ranked according to the gross value added at factor cost which they generate. A distinction is made between principal activity and secondary activities.
4. If no value-added figures are available, other criteria must be used, such as, for example, employment, payroll, turnover and assets, with a view to obtaining the closest possible approximation of the classification which would have been obtained on the basis of value added.
5. Units are classified in terms of their activities. If one activity accounts for over 50 % of the value added this determines the classification of the unit. In all other cases, classification rules must be observed. Classification is carried out in stages from the highest level of aggregation which is the section (one letter), down to the class (four digits) via the division (two digits) and the group (three digits). The classification at each level must be compatible with the previous level. The Statistical Programme Committee referred to in Article 7 of Regulation (EEC) No 3037/90 has competence in this field.
6. Principal and secondary activities are backed up by ancillary activities, such as, for example, administration, accounts, data processing, process monitoring, purchasing, sales and marketing, warehousing, repairs, transport and renovation. These ancillary activities within a unit are carried out in order to permit or facilitate production by the unit of goods and services for third parties. The products of ancillary activities are not themselves supplied to third parties.
7. The notion of ancillary activities is developed in section IV B.

ANNEX 5. DEFINITION OF ECONOMIC INDICATORS

Source: (Reg. 2700/1998 or if specified 1670/2003)

Terms of Reference required to collect data on following indicators. The definitions applied were closely related to the definitions applied by Eurostat in the Structural Business Statistics. Comments stated in italics provide further specifications and clarifications which have been used for the purpose of the survey for indicators which are not (well) defined by SBS.

OPERATIONS – COSTS AND REVENUE

Turnover total
Turnover per species or group of species
Other income
Personnel costs
Unpaid labour
Energy costs
Live raw material costs
Feed raw material costs
Other operational costs
Depreciation
Other costs
Profit

BALANCE SHEET – ASSETS AND LIABILITIES

Gross investment in tangible goods
Total assets
Net capital
Debts
Total balance sheet

EMPLOYMENT

Number of persons employed
Number of full time employees
Number of part-time employees
Number of seasonal employees
Number of employees in FTE (*not collected but calculated*)
Number of unpaid workers

OTHER INDICATORS

Legal status
Output in tonnes per species
Area cultured

INDICATORS FOR THE WHOLE SECTOR

Number of enterprises
Number of enterprises by legal status

Variable	SBS Definition (Reg. 2700/1998 or if specified 1670/2003) and Comments
Turnover	<p>12 11 0 Code: 12 11 0 Title: Turnover</p> <p><i>Definition</i> Turnover comprises the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties. Turnover includes all duties and taxes on the goods or services invoiced by the unit with the exception of the VAT invoiced by the unit <i>vis-à-vis</i> its customer and other similar deductible taxes directly linked to turnover. It also includes all other charges (transport, packaging, etc.) passed on to the customer, even if these charges are listed separately in the invoice. Reduction in prices, rebates and discounts as well as the value of returned packing must be deducted. <i>Note:</i> indirect taxes can be separated into three groups.</p> <ol style="list-style-type: none"> i. The first comprises VAT and other deductible taxes directly linked to turnover which are excluded from turnover. These taxes are collected in stages by the enterprise and fully borne by the final purchaser. ii. The second group concerns all other taxes and duties linked to products which are either (1) linked to turnover and not deductible or (2) taxes on products not linked to turnover. Included here are taxes and duties on imports and taxes on the production, export, sale, transfer, leasing or delivery of goods and services or as a result of their use for own consumption or own capital formation. iii. The third group concerns taxes and duties linked to production. These are compulsory, unrequited payments, in cash or in kind which are levied by general government, or by the institutions of the European Union, in respect of the production and importation of goods and services, the employment of labour, the ownership or use of land, buildings or other assets used in production irrespective of the quantity or the value of goods and services produced or sold.
Turnover per species or group of species	
Other income	<p>12 11 0 – para 4 Income classified as other operating income, financial income and extraordinary income and operating subsidies received from public authorities or the institutions of the European Union. <i>COMMENT: Linked to other activities than farm production (e.g. sale of equipment, income from interest, etc.)</i></p>
Personnel costs	<p>Code: 13 31 0 Title: Personnel costs</p> <p><i>Definition</i> Personnel costs are defined as the total remuneration, in cash or in kind, payable by an employer to an employee (regular and temporary employees as well as home-workers) in return for work done by the latter during the reference period. Personnel costs also include taxes and employees' social security contributions retained by the unit as well as the employer's compulsory and voluntary social contributions. Personnel costs are made up of: — wages and salaries, — employers' social security costs.</p> <p>All remuneration paid during the reference period is included, regardless of whether it is paid on the basis of working time, output or piecework, and whether it is paid regularly or not. Included are all gratuities, workplace and performance bonuses, <i>ex gratia</i> payments, 13th month pay (and similar fixed bonuses), payments made to employees in consideration of dismissal, lodging, transport, cost of living and family allowances, commissions, attendance fees, overtime, night work, etc. as well as taxes, social security</p>

	<p>contributions and other amounts owed by the employees and retained at source by the employers. Also included are the social security costs for the employer. These include employer's social security contributions to schemes for retirement pensions, sickness, maternity, disability, unemployment, occupational accidents and diseases, family allowances as well as other schemes. These costs are included regardless of whether they are statutory, collectively agreed, contractual or voluntary in nature.</p> <p>Payments for agency workers are not included in personnel costs.</p> <p><i>COMMENT: including social security costs and including remuneration of owner</i></p>
Unpaid labour	<p><i>COMMENT:</i> <i>To be estimated as unpaid fte* average personnel costs per fte (in fact 'opportunity costs')</i></p>
energy costs	<p>Code: 13 11 0 Title: Total purchases of goods and services <i>Definition</i></p>
live raw material costs	<p>Purchases of goods and services include the value of all goods and services purchased during the accounting period for resale or consumption in the production process, excluding capital goods the consumption of which is registered as consumption of fixed capital. The goods and services concerned may be either resold with or without further transformation, completely used up in the production process or, finally, be stocked.</p>
feed raw material costs	<p>Included in these purchases are the materials that enter directly into the goods produced (raw materials, intermediary products, components), plus non-capitalized small tools and equipment. Also included are the value of ancillary materials (lubricants, water, packaging, maintenance and repair materials, office materials) as well as energy products. Included in this variable are the purchases of materials made for the production of capital goods by the unit.</p>
other operational costs	<p>Services paid for during the reference period are also included regardless of whether they are industrial or non-industrial. In this figure are payments for all work carried out by third parties on behalf of the unit including current repairs and maintenance, installation work and technical studies. Amounts paid for the installation of capital goods and the value of capitalized goods are excluded.</p> <p>Also included are payments made for non-industrial services such as legal and accountancy fees, patents and license fees (where they are not capitalized), insurance premiums, costs of meetings of shareholders and governing bodies, contributions to business and professional associations, postal, telephone, electronic communication, telegraph and fax charges, transport services for goods and personnel, advertising costs, commissions (where they are not included in wages and salaries), rents, bank charges (excluding interest payments) and all other business services provided by third parties. Included are services which are transformed and capitalized by the unit as capitalized production.</p> <p>Expenditure classified as financial expenditure or extraordinary expenditure in company accounts is excluded from the total purchases of goods and services.</p> <p>Purchases of goods and services are valued at the purchase price excluding deductible VAT and other deductible taxes linked directly to turnover.</p> <p>All other taxes and duties on the products are therefore not deducted from the valuation of the purchases of goods and services. The treatment of taxes on production is not relevant in the valuation of these purchases.</p> <p><i>COMMENTS: Live raw material refers to eggs, fry, fingerlings, smolts...</i> <i>Other operational costs refer to (sanitary, packaging, maintenance...)</i></p>
Depreciation	<p>Item is not defined by SBS <i>COMMENT: capital costs - to be based on tax declarations.</i></p>
Other costs	<p>item is not defined by SBS <i>COMMENT: financial costs, non-reimbursable taxes, if not yet accounted for elsewhere</i></p>
Profit	<p>Code: 42 40 0 Title: Profit or loss on ordinary activities <i>Definition</i> This variable is defined in Article 22 and following of Council Directive 78/660/EEC (1) (<i>see below</i>) based on Article 54 (3) (g) of the Treaty on the annual accounts of certain</p>

	<p>types of companies. Reg 1670/2003</p> <p><i>COMMENT: for the financial year</i></p> <p><i>this definition excludes financial costs (= interest on loans) as this is accounted for under 'Other costs'</i></p> <p><i>Note, that the mentioned directive implicitly only states that Profit = Revenues - costs</i></p>
Gross investment in tangible goods	<p>Code: 15 11 0</p> <p>Title: Gross investment in tangible goods</p> <p><i>Definition</i></p> <p>Investment during the reference period in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalized production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. The threshold for the useful life of a good that can be capitalized may be increased according to company accounting practices where these practices require, a greater expected useful life than the one-year threshold indicated above.</p> <p>All investments are valued prior to (i.e. gross of) value adjustments, and before the deduction of income from disposals. Purchased goods are valued at purchase price, i.e. transport and installation charges, fees, taxes and other costs of ownership transfer are included. Own produced tangible goods are valued at production cost. Goods acquired through restructuring (such as mergers, take-overs, break-ups, split-off) are excluded. Purchases of small tools which are not capitalized are included under current expenditure. Also included are all additions, alterations, improvements and renovations which prolong the service life or increase the productive capacity of capital goods. Current maintenance costs are excluded as is the value and current expenditure on capital goods used under rental and lease contracts. Investment in intangible and financial assets are excluded. Concerning the recording of investments where the invoicing, delivery, payment and first use of the good may take place in different reference periods, the following method is proposed as an objective:</p> <p>Investments are recorded when the ownership is transferred to the unit that intends to use them.</p> <p>Capitalised production is recorded when produced. Concerning the recording of investments made in identifiable stages, each part-investment should be recorded in the reference period in which they are made.</p> <p>In practice this may not be possible and company accounting conventions may mean that the following approximations to this method need to be used:</p> <ul style="list-style-type: none"> (i) investments are recorded in the reference period in which they are delivered, (ii) investments are recorded in the reference period in which they enter into the production process, (iii) investments are recorded in the reference period in which they are invoiced, (iv) investments are recorded in the reference period in which they are paid for.
Total assets	<p>Code: 43 30 0</p> <p>Title: Balance sheet total</p> <p><i>Definition</i></p> <p>This variable consists of the sum of items 1 to 16 of the asset side of the balance sheet or of the sum of items 1 to 14 of the liability side of the balance sheet.</p> <p>Reg. 1670 / 2003</p>
Net capital	<p>To be obtained from balance sheets</p> <p><i>COMMENT: This is equity capital</i></p>
Debts	<p>To be obtained from balance sheets</p> <p><i>COMMENT: Sum of loans (short and long term debts)</i></p>
Total balance sheet	<p>to be equal to total assets = net capital + debts</p>
Number of persons employed	<p>Code: 16 11 0</p> <p>Title: Number of persons employed</p> <p><i>Definition</i></p> <p>The number of persons employed is defined as the total number of persons who work in the observation unit (inclusive of working proprietors, partners working regularly in</p>

	<p>the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it (e.g. sales representatives, delivery personnel, repair and maintenance teams). It includes persons absent for a short period (e.g. sick leave, paid leave or special leave), and also those on strike, but not those absent for an indefinite period. It also includes part-time workers who are regarded as such under the laws of the country concerned and who are on the payroll, as well as seasonal workers, apprentices and home workers on the payroll.</p> <p>The number of persons employed excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service.</p> <p>Unpaid family workers refer to persons who live with the proprietor of the unit and work regularly for the unit, but do not have a contract of service and do not receive a fixed sum for the work they perform. This is limited to those persons who are not included on the payroll of another unit as their principal occupation.</p> <p><i>Note:</i> In order to check the comparability of data, it is necessary to indicate whether voluntary workers have been included under this heading or not.</p>
Number of full time employees	<p><i>COMMENT: This has no SBS definition. It regards the number of persons who can be considered to work full time in the company, i.e. more than 36 hours/week, 53 weeks/year (incl. vacations)</i></p>
Number of part-time employees	<p>Code: 16 13 1</p> <p>Title: Number of part-time employees</p> <p><i>Definition</i></p> <p>This is a division of the number of employees calculated by reference to the number of hours worked per week for which they are paid; this number of hours is considered in relation to the length of what is considered to be a full-time working week in the Member State or the sector of the unit or the unit itself.</p> <p>Part-time workers are persons whose usual hours of work are less than the normal working hours. This definition encompasses all forms of part-time work (half-day work, work for one, two or three days a week, etc.). This number may be established at the national, regional, industrial or unit level.</p> <p>The number of employees may be broken down according to the weekly number of hours which they work.</p> <p>This number of hours is considered in relation to the length of what is regarded as a standard full-time working week in the Member State, region, industry or unit.</p> <p>It should be noted that whereas the 'full-time employee' category is relatively homogeneous, the same cannot be said of the 'part-time employee' category since this can cover anything between 20 % or even less and 80 % or more of the normal working hours of the employing unit.</p>
Number of seasonal employees	<p><i>COMMENT: Persons hired for specific regular periods of the year. SBS does not provide a definition.</i></p>
Number of employees in FTE	<p>Code: 16 14 0</p> <p>Title: Number of employees in full-time equivalent units</p> <p><i>Definition</i></p> <p>The number of employees converted into full-time equivalents (FTE).</p> <p>Figures for the number of persons working less than the standard working time of a full-year full-time worker, should be converted into full-time equivalents, with regard to the working time of a full-time full-year employee in the unit.</p> <p>Included in this category are people working less than a standard working day, less than the standard number of working days in the week, or less than the standard number of weeks/months in the year. The conversion should be carried out on the basis of the number of hours, days, weeks or months worked.</p> <p><i>COMMENT:</i></p> <p><i>To be estimated from (personnel costs + value of unpaid labour) / average wage. This excluded unpaid owner (he is not employee)</i></p> <p><i>Standard FTE is often 2000 hours/year, although some countries use a lower threshold.</i></p>

Number of unpaid workers	<p><i>COMMENT:</i> <i>This will be required in hours per year, to allow the calculation of the (opportunity) costs. SBS does not provide a definition.</i></p>
Number of enterprises	<p>Code 11 11 0 A count of the number of enterprises registered to the population concerned in the business register corrected for errors, in particular frame errors. Dormant units are excluded. This statistic should include all units active during at least a part of the reference period. <i>COMMENT:</i> <i>This refers to legal entities, not production units</i></p>
Output	<p>Tonnes, live weights per species</p>
Number of enterprises by legal status	<p>Code: 11 11 1 Title: Number of enterprises broken down by legal status <i>Definition</i> The number of enterprises (see variable 11 11 0) is broken down by legal status as follows: incorporated enterprises limited by shares, cooperative enterprises, public-law enterprises, branches of enterprises with head office in non-EEA countries, others. (Reg. 1670/2003)</p>

ANNEX 6. CODE OF BEST PRACTICE

Source: Eurostat

Eurostat has come out with the first documents on Code of Practice only in the beginning of 2005. This means that this is still an area in development, and while quite a few documents have been prepared, the implementation (at EU and national level) is progressing gradually.

European Code

The European Statistics Code of Practice is divided into 3 areas, based on 15 principles, each with specific indicators – full text is in Annex A. These are the concepts, which have to be translated into operational terms.

The 3 areas and 15 principles are:

- A. *institutional environment*
 - 1: professional independence
 - 2: mandate for data collection
 - 3: adequacy of resources
 - 4: quality commitment
 - 5: statistical confidentiality
 - 6: impartiality and objectivity
- B. *statistical processes*
 - 7: sound methodology
 - 8: appropriate statistical procedures
 - 9: non-excessive burden on respondents
 - 10: cost effectiveness
- C. *statistical output*
 - 11: relevance
 - 12: accuracy and reliability
 - 13: timeliness and punctuality
 - 14: coherence and comparability
 - 15: accessibility and clarity

There is a significant amount of literature / documents on the Eurostat webpages:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=2273,1,2273_47141302&_dad=portal&_schema=PORTAL

in particular under ‘Quality reporting’.

Two or three documents of particular relevance (although there may be more):

- Standard quality indicators (see the document)
- Standard quality report (and Guidelines how to prepare it)
- Checklist for survey managers (see the condensed version)

The document on ‘Standard quality indicators’ as well as the Condensed version of the Checklist’ refer only to principles on statistical output (nr. 11-15), but not to the others.

Institutional environment

PRINCIPLE 1: PROFESSIONAL INDEPENDENCE

The professional independence of statistical authorities from other policy, regulatory or administrative departments and bodies, as well as from private sector operators, ensures the credibility of European statistics.

Indicators

- The independence of the statistical authority from political and other external interference in producing and disseminating official statistics is specified in law.
- The head of the statistical authority has sufficiently high hierarchical standing to ensure senior-level access to policy authorities and administrative public bodies. He/she should be of the highest professional calibre.
- The head of the statistical authority and, where appropriate, the heads of its statistical bodies have responsibility for ensuring that European statistics are produced and disseminated in an independent manner.
- The head of the statistical authority and, where appropriate, the heads of its statistical bodies have the sole responsibility for deciding on statistical methods, standards and procedures, and on the content and timing of statistical releases.
- The statistical work programmes are published, and periodic reports describe progress made.
- Statistical releases are clearly distinguished and issued separately from political/policy statements.
- The statistical authority, when appropriate, comments publicly on statistical issues, including criticisms and misuses of official statistics.

PRINCIPLE 2: MANDATE FOR DATA COLLECTION

Statistical authorities must have a clear legal mandate to collect information for European statistical purposes. Administrations, enterprises and households, and the public at large may be compelled by law to allow access to or deliver data for European statistical purposes at the request of statistical authorities.

Indicators

- The mandate to collect information for the production and dissemination of official statistics is specified in law.
- The statistical authority is allowed by national legislation to use administrative records for statistical purposes.
- On the basis of a legal act, the statistical authority may compel response to statistical surveys.

PRINCIPLE 3: ADEQUACY OF RESOURCES

The resources available to statistical authorities must be sufficient to meet European statistics requirements.

Indicators

- Staff, financial, and computing resources, adequate both in magnitude and in quality, are available to meet current European statistics needs.
- The scope, detail and cost of European statistics are commensurate with needs.
- Procedures exist to assess and justify demands for new European statistics against their cost.
- Procedures exist to assess the continuing need for all European statistics, to see if any can be discontinued or curtailed to free up resources.

PRINCIPLE 4: QUALITY COMMITMENT

All ESS members commit themselves to work and cooperate according to the principles fixed in the 'Quality declaration of the European statistical system'.

Indicators

- Product quality is regularly monitored according to the ESS quality components.

- Processes are in place to monitor the quality of the collection, processing and dissemination of statistics.
- Processes are in place to deal with quality considerations, including trade-offs within quality, and to guide planning for existing and emerging surveys.
- Quality guidelines are documented and staff are well trained. These guidelines are spelled out in writing and made known to the public.
- There is a regular and thorough review of the key statistical outputs using external experts where appropriate.

PRINCIPLE 5: STATISTICAL CONFIDENTIALITY

The privacy of data providers (households, enterprises, administrations and other respondents), the confidentiality of the information they provide and its use only for statistical purposes must be absolutely guaranteed.

Indicators

- Statistical confidentiality is guaranteed in law.
- Statistical authority staff sign legal confidentiality commitments on appointment.
- Substantial penalties are prescribed for any wilful breaches of statistical confidentiality.
- Instructions and guidelines are provided on the protection of statistical confidentiality in the production and dissemination processes. These guidelines are spelled out in writing and made known to the public.
- Physical and technological provisions are in place to protect the security and integrity of statistical databases.
- Strict protocols apply to external users accessing statistical microdata for research purposes.

PRINCIPLE 6: IMPARTIALITY AND OBJECTIVITY

Statistical authorities must produce and disseminate European statistics respecting scientific independence and in an objective, professional and transparent manner in which all users are treated equitably.

Indicators

- Statistics are compiled on an objective basis determined by statistical considerations.
- Choices of sources and statistical techniques are informed by statistical considerations.
- Errors discovered in published statistics are corrected at the earliest possible date and publicised.
- Information on the methods and procedures used by the statistical authority are publicly available.
- Statistical release dates and times are pre-announced.
- All users have equal access to statistical releases at the same time and any privileged prerelease access to any outside user is limited, controlled and publicised. In the event that leaks occur, pre-release arrangements should be revised so as to ensure impartiality.
- Statistical releases and statements made in press conferences are objective and non-partisan.

Statistical processes

European and other international standards, guidelines and good practices must be fully observed in the processes used by the statistical authorities to organise, collect, process and disseminate official statistics. The credibility of the statistics is enhanced by a reputation for good management and efficiency. The relevant aspects are sound methodology, appropriate statistical procedures, non-excessive burden on respondents and cost effectiveness.

PRINCIPLE 7: SOUND METHODOLOGY

Sound methodology must underpin quality statistics. This requires adequate tools, procedures and expertise.

Indicators

- The overall methodological framework of the statistical authority follows European and other international standards, guidelines and good practices.
- Procedures are in place to ensure that standard concepts, definitions and classifications are consistently applied throughout the statistical authority.
- The business register and the frame for population surveys are regularly evaluated and adjusted if necessary in order to ensure high quality.
- Detailed concordance exists between national classifications and sectorisation systems and the corresponding European systems.
- Graduates in the relevant academic disciplines are recruited.
- Staff attend international relevant training courses and conferences, and liaise with statistician colleagues at international level in order to learn from the best and to improve their expertise.
- Cooperation with the scientific community to improve methodology is organised and external reviews assess the quality and effectiveness of the methods implemented and promote better tools, when feasible.

PRINCIPLE 8: APPROPRIATE STATISTICAL PROCEDURES

Appropriate statistical procedures, implemented from data collection to data validation, must underpin quality statistics.

Indicators

- Where European statistics are based on administrative data, the definitions and concepts used for the administrative purpose must be a good approximation to those required for statistical purposes.
- In the case of statistical surveys, questionnaires are systematically tested prior to the data collection.
- Survey designs, sample selections, and sample weights are well based and regularly reviewed, revised or updated as required.
- Field operations, data entry, and coding are routinely monitored and revised as required.
- Appropriate editing and imputation computer systems are used and regularly reviewed, revised or updated as required.
- Revisions follow standard, well-established and transparent procedures.

PRINCIPLE 9: NON-EXCESSIVE BURDEN ON RESPONDENTS

The reporting burden should be proportionate to the needs of the users and should not be excessive for respondents. The statistical authority monitors the response burden and sets targets for its reduction over time.

Indicators

- The range and detail of European statistics demands is limited to what is absolutely necessary.
- The reporting burden is spread as widely as possible over survey populations through appropriate sampling techniques.
- The information sought from businesses is, as far as possible, readily available from their accounts and electronic means are used where possible to facilitate its return.
- Best estimates and approximations are accepted when exact details are not readily available.
- Administrative sources are used whenever possible to avoid duplicating requests for information.
- Data sharing within statistical authorities is generalised in order to avoid multiplication of surveys.

PRINCIPLE 10: COST EFFECTIVENESS

Resources must be effectively used.

Indicators

- Internal and independent external measures monitor the statistical authority's use of resources.
- Routine clerical operations (e.g. data capture, coding and validation) are automated to the extent possible.
- The productivity potential of information and communications technology is being optimised for data collection, processing and dissemination.
- Proactive efforts are being made to improve the statistical potential of administrative records and avoid costly direct surveys.

Statistical output Available statistics must meet users' needs. Statistics comply with European quality standards and serve the needs of European institutions, governments, research institutions, business concerns and the public generally. The important issues concern the extent to which the statistics are relevant, accurate and reliable, timely, coherent, comparable across regions and countries, and readily accessible by users.

PRINCIPLE 11: RELEVANCE

European statistics must meet the needs of users.

Indicators

- Processes are in place to consult users, monitor the relevance and practical utility of existing statistics in meeting their needs, and advise on their emerging needs and priorities.
- Priority needs are being met and reflected in the work programme.
- User satisfaction surveys are undertaken periodically.

PRINCIPLE 12: ACCURACY AND RELIABILITY

European statistics must accurately and reliably portray reality.

Indicators

- Source data, intermediate results and statistical outputs are assessed and validated.
- Sampling errors and non-sampling errors are measured and systematically documented according to the framework of the ESS quality components.
- Studies and analyses of revisions are carried out routinely and used internally to inform statistical processes.

PRINCIPLE 13: TIMELINESS AND PUNCTUALITY

European statistics must be disseminated in a timely and punctual manner.

Indicators

- Timeliness meets the highest European and international dissemination standards.
- A standard daily time is set for the release of European statistics.
- Periodicity of European statistics takes into account user requirements as much as possible.
- Any divergence from the dissemination time schedule is publicised in advance, explained and a new release date set.
- Preliminary results of acceptable aggregate quality can be disseminated when considered useful.

PRINCIPLE 14: COHERENCE AND COMPARABILITY

European statistics should be consistent internally, over time and comparable between regions and countries; it should be possible to combine and make joint use of related data from different sources.

Indicators

- Statistics are internally coherent and consistent (e.g. arithmetic and accounting identities observed).
- Statistics are coherent or reconcilable over a reasonable period of time.
- Statistics are compiled on the basis of common standards with respect to scope, definitions, units and classifications in the different surveys and sources.
- Statistics from the different surveys and sources are compared and reconciled.
- Cross-national comparability of the data is ensured through periodical exchanges between the European statistical system and other statistical systems; methodological studies are carried out in close cooperation between the Member States and Eurostat.

PRINCIPLE 15: ACCESSIBILITY AND CLARITY

European statistics should be presented in a clear and understandable form, disseminated in a suitable and convenient manner, available and accessible on an impartial basis with supporting metadata and guidance.

Indicators

- Statistics are presented in a form that facilitates proper interpretation and meaningful comparisons.
- Dissemination services use modern information and communication technology and, if appropriate, traditional hard copy.
- Custom-designed analyses are provided when feasible and are made public.
- Access to microdata can be allowed for research purposes. This access is subject to strict protocols.
- Metadata are documented according to standardised metadata systems.
- Users are kept informed on the methodology of statistical processes and the quality of statistical outputs with respect to the ESS quality criteria.
-

DEFINITIONS: FOR THE PURPOSE OF THIS DOCUMENT:

‘European statistics’ shall mean Community statistics as defined in Council Regulation (EC) No 322/97 of 17 February 1997 on Community statistics, produced and disseminated by national statistical authorities and the Community’s '73 statistical authority (Eurostat) in conformity with Article 285(2) of the Treaty.

The ‘statistical authority’ shall mean, at national level, the national statistical institute (NSI) and other statistical bodies in charge of producing and disseminating European statistics and, at Community level, Eurostat.

The ‘European statistical system’, hereinafter referred to as ‘the ESS’, shall mean the partnership comprising Eurostat, national statistical institutes and other national statistical bodies responsible in each Member State for producing and disseminating European statistics.

ANNEX 7. TERMS OF REFERENCE OF THE STUDY

- 1) Review available punctual studies describing the sector's performance;
- 2) Establish a "Catalogue of Best Practices" in current data collection programmes;
- 3) On the basis of findings under 1 and 2, the contractor shall assess, in cooperation with the Commission services, the feasibility of a European permanent scheme for the collection of economic data;
- 4) Assess the feasibility of collecting the indicators below and the costs of collecting them on a regular basis:
 - turnover: per species or group of species
 - production costs
 - i. wages and salaries, including social security costs
 - ii. energy costs
 - iii. live raw material (eggs, fry, fingerlings, smolts...) costs
 - iv. feed raw material costs
 - v. other operational costs (sanitary, packaging, maintenance...)
 - depreciation (capital costs)
 - other costs (financial costs, extraordinary costs, taxes...)
 - profit for the financial year
 - gross investment in tangible goods
 - total assets (capital value)
 - net capital
 - debts (short and long term debts)
 - total balance sheet
 - value of unpaid work (familiar enterprises)
 - employment
 - i. full time and equivalent
 - ii. part time
 - iii. seasonal
 - number of enterprises
- 5) Establish the most appropriate and cost-effective structure for the collection and/or aggregation of economic data on the European aquaculture sector;
- 6) Collection of baseline data (including number of enterprises and employment, as detailed in point 4. above, incl. concepts and definitions used) required for the evaluation of the European aquaculture strategy. The collection will be based on original field work carried out by the contractor, and will not consist only of the gathering of existing official data. It will include surveys and interviews with the relevant stakeholders (producers' associations, feed manufacturers, chambers of commerce etc) and will be validated through the cross-check of the results with the results of previous studies (partly provided by the Commission) and other indicators like productivity in volume and value.

ANNEX 8. LIST OF ABBREVIATIONS

Cgs	Cages
E&P	Enclosures and pens
On-b	On-bottom
Off-b	Off-bottom
Pnd	Ponds
Rec	Recirculation systems
ROA	Return on assets
ROD	Return on debts
ROE	Return on equity,
ROI	Return on investment
T&R	Tanks and raceways

ANNEX 9. SUMMARY OF SWOT ANALYSES OF AQUACULTURE IN THE NATIONAL STRATEGIC PLANS

	- STRENGTHS	- WEAKNESSES	- OPPORTUNITIES	- THREATS
Austria	<ul style="list-style-type: none"> - product quality, - environmental production, - family business, - link with tourism - high and increasing professional level 	<ul style="list-style-type: none"> - low competitiveness (legal requirements) . 	<ul style="list-style-type: none"> - processing and marketing of high quality fish, - introduction of new technologies and prevention of epidemics. 	<ul style="list-style-type: none"> - complexity and profitability of investments in new technologies
Belgium	<ul style="list-style-type: none"> - positive image, - strong know-how in research, - protected marine areas guarantee water quality. 	<ul style="list-style-type: none"> - high production costs, - lack of energy sources, - coast is not suitable for delimitation of mariculture areas, - discharging of nutrients from carp and trout farming, etc. 	<ul style="list-style-type: none"> - progress in fish farming technologies and genetics, - new project for farming of mussels and sole, - farming inside windmill parks at sea. 	<ul style="list-style-type: none"> - uncertain profitability in relation to required investments, - cheap imports, - environmental requirements (e.g. in relation to water discharge), - insufficient water quality close to coast.
Bulgaria	<ul style="list-style-type: none"> - Environmental conditions and water quality are excellent for growing of fresh-water species - Existence of water objects with unused capacity opportunities in fishery economical relation - Improved quality of marine waters during the last years and increasing production through expanding the species of marine aquaculture; - Good tradition and experience of net-cages fish production in big dams - Favorable natural conditions attract foreign investments - Human resources potential - Permanent biology monitoring in natural water basins and fish breeding farms - Applying of well developed environmentally friendly production technologies for farming of freshwater species; - Good developed technologies for intensive and superintensive cultivating of freshwater species; - Diversification with high market value species (sturgeon, crayfish); - Not fully used opportunities for fish breeding in the existing fish breeding farms 	<ul style="list-style-type: none"> - Ineffective use of the production capacity of many of the biggest aquaculture farms - Irrational and ineffective general multifunctional use of state owned dams, as well as of middle and small dams of municipalities ownership as multifunctional facilities - Need for reconstruction of production facilities /outdated installations/ - Limited access to financial resources - Insufficient state financial support for production sector in respect to save and develop breeding population of genetically clean, prolific and productive lines - Environmental pollution - Low quality of fish feed having negative impact on environment - Some of the fees producers have to pay to the different state authorities (according to different legislation) are unjustifiably high - Weak policy framework for development of the sector Insufficient experience in effective modern producing technology for new species of fish incl. re-circulation fish breeding systems - Lack of organised marketing eliminates profitability of least efficient farms Poor implementation of research results 	<ul style="list-style-type: none"> - Priority development of aquaculture sector to compensate the critical situation with the natural fish resources - Establishing and recognizing of fish producers organizations - Effective use of financial EU instruments for better utilization of the available resources and capacity for production freshwater and marine aquaculture products - Building of new capacities for breeding of fish and other aquatic organisms - Improvement of production infrastructure - Improvement of competitiveness of fish producers on international markets - Extension of qualifications and improving of technical skills of employees in the sector - Enhancement of fish production effectiveness and profitability via introducing of new technologies, new fish species - Increased demand of freshwater species - Increased interest of investors in aquaculture production - Potential for diversification of aquaculture production with market value and demanded on international market delicacy fish species and fish products (sturgeon, eel, crayfish, turbot, mussels) 	<ul style="list-style-type: none"> - Permanent closure of small scale aquaculture producers and loss of skills and productive capacity - Development of the state policy in fisheries and aquaculture sector is in the beginning - Lack of adequate state measures and compensations in case of natural disasters and high losses of production, especially losses of broodstock and fish-fingerlings - Conflicts on water resources exploitation between general and common use (water supply, electricity etc.) and complex plus specific use for aquaculture sector development - Bankruptcy of small-scale aquaculture producers (mainly because of lack of adequate financial support and preferences, low market demand, lack of competitive farmed fish species and aquaculture technologies)

	- STRENGTHS	- WEAKNESSES	- OPPORTUNITIES	- THREATS
			<ul style="list-style-type: none"> - Increased needs for fingerlings for supporting the natural populations in the inland waters and the river Danube. - Potential for development and applying technologies for organic aquaculture - Improving quality of fish feed and decreasing the negative influence on the environment - Better financial support of producers for aligning with EU standards (national and European funds); - Improving of fish processing facilities and capacities will be in direct link to the development and increasing of domestic aquaculture production and with the improvement of market demand and consumers requirements for quality and diversity of fish and fish products 	
Cyprus	-	-	-	-
Czech Rep.	<ul style="list-style-type: none"> - Czech fishpond farming know-how - high quality of breeding material - extra-production functions of fishponds - use of fishing grounds and fishpond systems by the greater public for recreational activities - competitiveness of fishing enterprises - existence of organizations coordinating the interests of fisheries - sufficient processing capacity meeting current EU standards - knowledge and education systems - trademarks - fisheries legislation - stabilized market 	<ul style="list-style-type: none"> - silting (sediment in fishponds) - scattered fishponds - insufficient appropriate water sources for breeding salmon fish - low economic return - length of breeding period of carp - high degree of physical labour - age and wear of technical equipment, - insufficient advertising of fish products - seasonal nature of the market and limited consumer interest in fish and fishery products - influences of fish-eating predators - inappropriate management in river basins above fishponds causing excessive erosion - decrease in biological diversity and ecological stability of fishpond ecosystems caused by high measure - of agricultural operation intensification in second half of last century - reduction of economic activities in fishponds by decreasing of production methods intensity for reasons - of adopted legal standards in the field of 	<ul style="list-style-type: none"> - greater publicity of aquaculture products - increasing agro tourism services - increasing production of other fish species - increasing the assortment of products from processed fish - modernization of technical equipment of processing facilities - revitalization and modernisations of fish lakes and other aquaculture units - measures to prevent illness - utilisation of technology minimising adverse environmental impacts 	<ul style="list-style-type: none"> - limitations of economic activity in fishponds by increasing of production methods intensity due to the implementation of new legal standards in the area of environment - import of less expensive fish and products - environmental burden in sediment formation - spread of dangerous fish illnesses - influences of climatic phenomena - increase in number of fish-eating predators

	- STRENGTHS	- WEAKNESSES	- OPPORTUNITIES	- THREATS
		environment -		
Denmark	- Advanced environmental technology.	- Image problems related to environment, The relations to local authorities is problematic do to environmental issues	- Systematic export, New species, National regulation support long term optimal utilization of the production opportunities in aquaculture, Increased cooperation between researchers and aquaculture for optimal production, Increased cooperation between researchers and aquaculture on the production site, Certification of production methods, Development of new methods and practice to reduce the environmental effects from aquaculture.	- New environmental demands that the industry cannot fulfill.
Estonia	- Existence of natural resources, water and fishery resources; - Clean and versatile nature; - Stable macroeconomic environment (trade relations with foreign countries); - Market demand and export potential for fish; - Availability of a technical basis for supervision (Veterinary and Food Board, Environmental Inspectorate)	- Significant shortcomings in the vocational training; - Problems with accessing capital for small businesses and consequently low investment level; - Insufficient long-term competitiveness of enterprises: low added value, insufficient usage of quality standards, low expenditure on innovation, weak marketing; - Weak socio-economic development of rural areas; - Underdeveloped infrastructure; - Dependence of fish farms on imported juveniles and roe due to the absence of centers for breeding.	- Higher market price for inland water fish; - High level of domestic demand for fishery and aquaculture products exceeding current production; - Diversification of aquaculture species and favourable natural conditions; - Increased demand for economic activities based on natural environment and cultural heritage (nature and culture tourism) contributing to the stabilisation of workforce in fisheries regions; - Maintaining and improving environmental conditions by favouring environmental investment; - Developing human capital (EU educational cooperation, virtual learning of international scope, in-service training and retraining)	- International competition; - Environmental pollution; - Decreasing quality of water bodies; - Increasingly strict environmental, hygiene, safety, etc. requirements; - Deterioration of conditions in natural habitats; - Increased complexity/scope of administration schemes resulting in increased costs (in the context of a limited state budget)
Finland	- Regional economic activity/importance - Fish as functional food - R&D - Infrastructure - Production strengths: Juvenile and reared production, roe production - Good disease situation	- Weak co-operation in the sector - Lack of business management - Lack of market orientation - Small-scale production - Poor profitability - Unilateral production - Short growth season: seasonal supply - Uneven quality of fish	- Market orientation - Co-operation in the sector and along the value chain - Increasing value added - Location guidance: larger units and economics of scale - New species - Piggybacking new technology - Functional food - Export market	- Environmental regulation - Lack of coordination/conflicting policies: industry, trade, environment - Volatility of international salmon market - Fish diseases - Pollution of the sea - Seals, cormorants.. - Environmental extremist groups

France – fish	<ul style="list-style-type: none"> - Competence of Research structures - High performance of production tools (FW, M) and hatcheries (M) - Regularity of supply, easy to track and fresh products - Dynamic professional structures - Involvement of the profession in a sustainable fish farming program (FW) - Keeping economic activities in rural areas (FW) and coastal areas (M) 	<ul style="list-style-type: none"> - Access to production sites (FW, M) and competition with other coastal activities, as tourism... (M) - Small size of the sector (M) - Access to water resource (FW) - Management of fish farming effluents (FW) - Need for technical support structures 	<ul style="list-style-type: none"> - High demand for fish products - Quality of aquaculture products - Environmental requirements - Inventory of aquaculture potentialities sites carried out by IFREMER (M) - Integrated coastal zone management (M) - Diversification of products via processing (FW) - Genetic selection of fish for farming (FW) - Sustainable management of production systems (FW) - Modernisation of production tools (FW) 	<ul style="list-style-type: none"> - Less positive image of farmed fish compared to wild fish - International competition on markets - Dependence of feed on marine proteins (fishmeal)
France - molluscs	<ul style="list-style-type: none"> - Long established sector of production, non dependent on wild resource catches - Positive image of mollusc bivalves produced in aquaculture (natural environment, no inputs, no veterinarian products) - A majority of small-scale, family-based companies contributing to employment in coastal areas - Stable utilization of public maritime grounds for bivalve farming - Potential development of markets - Professional organisation 	<ul style="list-style-type: none"> - The production is highly dependant on climate and environmental hazards - Producers are unable to protect themselves from microbiological and phytoplankton contaminations of farming areas - Ageing of the producers and problems of transfer of the enterprises - Inefficiency of the market organisation to face the more and more integrated distribution sector, in spite of the recent setting up of producer organisations - Lack of financial resources and staff to comply with all the institutional charges 	<ul style="list-style-type: none"> - Good perception of bivalve farming from consumers - Availability of sites highlighted by a first inventory of potential farming areas carried out ten years ago - Good outlooks for oyster consumption increase (especially through the development of new consumption modes) - The demand for further fresh mussel production (i.e. from long line farming) exists considering the current level of production at European level 	<ul style="list-style-type: none"> - Coastal areas are covered by a number of activities, among them tourism and residential sectors, which can be considered as prior economic sectors by some local authorities - Shellfish farming in open sea makes the production vulnerable to epizootics, disseminated in the environment by contaminated livestock. - Strong potential impact of sanitary crisis, all the more because the market is highly seasonal (as regards oysters) - Increasing number of administrative temporary prohibitions of production areas for consumer protection reasons - Trends in sale prices do not compensate for the increasing costs of production
Germany - carp	<ul style="list-style-type: none"> - high percentage of family businesses with high flexibility and high economical stability - mostly extensive production - exceedingly sustainable kind of aquaculture - habitat for endangered animal and plant species that are bound to aquatic habitats elements that are influencing the landscape and structure with high attractiveness to tourism 	<ul style="list-style-type: none"> - production partly on a small scale - production strongly depending on weather conditions - shortfalls on processing and marketing & sales - damages through piscivorous and therefore aquacultural harmful species that are under animal protection 	<ul style="list-style-type: none"> - expansion of upscale direct marketing - exploitation of new markets through development of new and existing products and bundling of offers - organisation and expansion of a second source of income through (angling and regional) tourism - rearing of stocking material for angling associations and reintroduction plans (tench, pike, pikeperch, etc.) - protection of markets through joint marketing initiatives (from the region for the region, EU-approved and –protected geographical origin and safeguarding of traceability) 	<ul style="list-style-type: none"> - partly critical economic situation caused by strong competition of neighbouring countries (cost advantage through lower labour costs and low environmental standards) - production and demand tends to decrease - few marketable products and competition with other (imported) aquaculture products - continuously tightening environmental requirements)

Germany - Trout	<ul style="list-style-type: none"> - all-season production and market supply - largely resource friendly production - high revenue through a fixed portion of the direct marketing, especially in the division of fresh fish, through partial processing and upgrading - expandable market of stocking material and by-fish for restocking programmes and angling (char, greyling, salmon, et al.) 	<ul style="list-style-type: none"> - competition by the growing market of alternative aquacultural products (e.g. gilthead, catfish) - impact by piscivorous species or high expenses for their repulsion, where possible - hardly any or no research and development/ admission of aquacultural therapeutic agents 	<ul style="list-style-type: none"> - high potential for intensification of production by using new technologies - rearing of stocking material for angling associations and reintroduction plans - organisation and expansion of a second source of income through (angling and regional) tourism - high potential for intensification of marketing - protection of markets through joint marketing initiatives (from the region for the region, EU-approved and –protected geographical origin) - further development of the upscale direct marketing with emphasis on the regionality and the 100%- traceability - exploitation of new markets through development of new and existing products and bundling of offers 	<ul style="list-style-type: none"> - increasing costs for feed due to worldwide decrease of the resource fish as the basis for fish-feed while, at the same time, worldwide expansion of aquaculture - resource limitation (high quality water) constrains growth of companies and use of effects of economies of scale - tightening environmental requirements handicap the spatial expansion of companies as well as the expansion through intensification - competition by the growing market of alternative aquacultural products (e.g. gilthead, various perch species) - high competition by neighbouring countries, mostly Denmark, France, Italy, and probably henceforth Poland
Germany Technical aquaculture	<ul style="list-style-type: none"> - very low consumption of water as a resource in recirculation systems - high growth-rates with physiologically perfect tempered circulating water - all-season production, adjusted to market demands - reuse of existing sources of heat 	<ul style="list-style-type: none"> - technically demanding and accident-prone - high capital demands, high risks and high operating costs in recirculation systems - net cages: problem of environmental impact still not solved 	<ul style="list-style-type: none"> - stabilization of lakes, recently evolved through surface mining, by adapted fish production in net cages - hardly any limitation in growth due to low consumption of resources - complete use of value-added chain through integrated production, processing and marketing 	<ul style="list-style-type: none"> - high economical risk because most facilities are still pilot plants and not yet over the experimental stage - mostly technically highly demanding and accident-prone technology - higher market risk
Greece	<ul style="list-style-type: none"> - Favorable culture conditions in terms of geomorphology, climatology and hydrobiology. - Availability of know how and experience in the application of modern production methods. - Collaboration of the companies with the research organizations in the implementation of research programs. - Vertical organization of the production units. - Low production cost and competitive price of the aquaculture products compared to the wild fish fishery products. - Proximity to the main consuming EU markets and reduced delivery times. 	<ul style="list-style-type: none"> - Inadequate application of modern marketing strategies. - Economic problems (liquidity) - Reduction of fish prices and low profitability especially in some species. - Low diversification of end products. - Lack of certification and label-products. - Out of date legislation. - Conflict in the utilization of the coastal area between aquaculture and other activities, mainly tourism. - Lack of national land planning. - Unfair competition from non EU countries. - Transport problems affecting small companies established in remote islands. - High risk business environment. 	<ul style="list-style-type: none"> - Targeted development of the sector and process control in all phases of the production. - Improvement of know how and training of more people. - Optimization of the production conditions in order to achieve: improvement of the living conditions of fish, protection of growing environment, protection of the public health and improvement of the end product quality. - Reduction of the production cost in order to reach competitive prices especially for the new species. - Application of up to date marketing practices for the sector products. - Emphasis on the information of the 	<ul style="list-style-type: none"> - Strong competition in the international trade environment. - Competition from alternative trophic sources and negative non documented publicity. - Reduction of fish stocks suitable for fishmeal production. - Increase of production costs due to the increase of fuel price. - Negative impact on the environment. - Escape of cultured species to the wild environment. - Threats for the public health through the infection of humans. - Limited cooperation of the producers with the organizations aiming at the promotion of the trade of aquaculture products.

	<ul style="list-style-type: none"> - Increased local consumption especially during the summer months due to tourism. - Application of quality control systems. - Strong penetration to the distribution channels up to the retail level. - Strong impact of the sector due to his position as the 2nd important contributor to the national export product. - Increase investment interest. - Creation of large companies able to act in the global trade environment. - Creation of employment in remote and disadvantageous areas. - Development of supporting companies producing hardware consumables and services. 	<ul style="list-style-type: none"> - Negative effects from the water disposals coming from several pollution sources: urban, agricultural or industrial. - Restricted participation of the farmers to the sector's associations to undertake common activities in favor of the sector. - Conflicting interests with tourism - Negative effects on the quality of the sea water. - Reduction of the traditional aquaculture activities. 	<ul style="list-style-type: none"> consumers in order to enlarge the consumers group. - Optimization of the quality control systems and improvement of the product certification process. - Modernization of the small and very small companies. - Implementation of the national plan for the establishment of "Organized Aquaculture Development Areas". - Improvement of the demand of value added aquaculture products. - Promotion of policies for the creation of growers groups and development cooperation. - Activation of the grower's co-operation. - Support of the activities targeting the protection and improvement of the environment. - Improvement of knowledge of all professionals of the sector through training programs. 	
Hungary	<ul style="list-style-type: none"> - Favourable climatic conditions - Production of good quality brood stock - Fish ponds serve as aquatic habitats - Possibilities for production in policulture - Food safety is higher in the case of fish produced under controlled conditions - The technological basis of water saving and environment friendly fish production is known - The technological basis of organic fish production is available in pond farms - Systems of quality assurance are introduced 	<ul style="list-style-type: none"> - Degraded fishponds, low technical level (infrastructure, machinery etc.) in the production - Low-qualified and aged work force - Significant regional differences in the conditions of production - Conservative approach of producers, low-level of innovation intensity - High rate of post-harvest and other losses - Lack of connections in integration - Low-level of organisations among producers - Low energy efficiency of intensive production - Low level of locally made fish feed usage 	<ul style="list-style-type: none"> - Improving the life quality of Hungarian population by supplying them with healthy fish - Continuous expansion of angling market - The priority development of cereal-based animal husbandry sectors - Increasing demand for the stocking of aquaculture-produced fish into natural waters (environment protection, recreation) - Unbeaten popularity of eco- and angling tourism - Alternative methods of land use are gaining ground - Demand for technology transfer from developing countries 	<ul style="list-style-type: none"> - Increasing damage caused by birds (cormorant) - Increasing production costs (water, energy, feed) - Appearance of Koi herpes virus - Environment-load fee - Water pollution - Conflicts between environment protection, water management and fisheries - The strict regulations of animal welfare, environment protection and nature conservation
Ireland	<ul style="list-style-type: none"> - Potential to provide sustainable source of seafood to meet growing demand 	<ul style="list-style-type: none"> - Sub-optimal levels of investment - Lack of buy-in by all stakeholders to coastal zone management - Lack of clear contingency planning for disease and biotoxin outbreaks - Supply failures of aquaculture product 	<ul style="list-style-type: none"> - Increasing environmentally sustainable production capacity to meet demand for seafood - Develop and implement codes of best practice for aquaculture – in terms of its regulation and its production methods 	<ul style="list-style-type: none"> - Market conditions and poor competitiveness - Disease outbreaks - Biotoxin closures (shellfish) - Lack of engagement by industry with environmental interests

			<ul style="list-style-type: none"> - Added value, high value production for niche markets - Embed a coherent coastal zone management strategy - Action on foot of Shellfish Waters Directive will ultimately produce a higher quality product and lead to substantial improvements in water quality in shellfish waters - Diversification into new species and production techniques 	<ul style="list-style-type: none"> - Lack of ability to provide reliable supply to processing sector - Designation under Shellfish Waters Directive yet to be completed and appropriate water quality action programmes yet to be fully implemented
Italy	<ul style="list-style-type: none"> - Potential development in marine and continental areas - Increasing national availability to grow sea bass and bream in open sea (offshore areas), - Increasing availability of technologies. - Research network developed and good dissemination of results. - Consumer's demand for sea bass is increasing - Role of Organized Retail in order to ensure a more efficient allocation of quality productions - Proximity to markets (OF) demanding fresh products - Increasing interest by Regions (NUTS 2), to the development of sustainable aquaculture. Regions have administrative and financial competencies - Potential for developing models of sustainable use for lakes and coastal lagoons 	<ul style="list-style-type: none"> - The lack of coastal management as a result of environmental conflict limits the allocation of marine areas - Maturity in eel and trout sectors. - The trout segment is declining due to consumer's preference and to the low cost with respect to other aquaculture products (salmon, seabream and seabass) - Low product differentiation (the label/brand is not developed) - Shellfish: risks of contamination by algal toxins, seasonal productions - Unavailability of reliable certification and communication systems that can inform and advice the consumer - Uncertainties concerning the dimension of fees which should be paid for the use of a sea area - Conflicts can arise due to the lack of strategic planning 	<ul style="list-style-type: none"> - Coastal pollution - Potential environmental conflicts caused by trout farms (according to EU Dir. 60/2000). - Health risks, pathogens can be transferred from farmed to wild species - Increasing negative perception of consumers for cultured sea- products - Saturation / overlapping in the market for some species - Lack of policies to promote producers brand/label's by the Organized Retail - Conflicts with other activities (tourism) - Environmental degradation and delays in the implementation of models for improving environment and economy of aquaculture sites 	<ul style="list-style-type: none"> - Offshore aquaculture development, with priority for fishermen - New markets - Integration with processing sector - Growth potential exists for actually marginal production (White Seabream & Umbrine); support vaccination programs and prophylactic measures in farms. - Diversification of production size - Processing of fresh fish and molluscs - Improving quality and certification in production process (animal welfare and the environment, total quality), traceability of product, brand/label policies, as part of strategic innovation - Take off of aid policies Europe / State / Regions for environmental upgrading of fisheries and aquaculture, concerning projects for the protection of collective goods as an opportunity for enterprises (coastal lagoons, ZTB, insular areas, protected areas) - Interventions strengthening aquaculture / fisheries and tourism plans in niche markets
Latvia	<ul style="list-style-type: none"> - government support for stocking, - biological management and education 	<ul style="list-style-type: none"> - small and fragmented sector, - insufficient marketing, - processing and infrastructure, - losses by wild predators, 	<ul style="list-style-type: none"> - good quality of inland waters, - no production restrictions, - availability of manpower and knowledge (can be internationally acquired), - protection of natural environments through the National Restocking Programme. 	<ul style="list-style-type: none"> - climatic conditions are not optimal, - likely deterioration of water quality due to economic development

Lithuania	<ul style="list-style-type: none"> - Sufficiently developed network of aquaculture enterprises capable to supplying consumers with carp production all the year round. - Extensive areas of organic ponds. - Creation and maintaining of jobs in the rural areas. 	<ul style="list-style-type: none"> o Inefficient management of the majority of aquaculture enterprises, insufficient skills for operating in the EU market. o Huge electric energy demand to fill in ponds with water increases the production costs of aquaculture enterprises. o Harm done by fish feeding wild birds to the owners of aquaculture enterprises. 	<ul style="list-style-type: none"> - Farming of new fish species with good market prospects in aquaculture enterprises. - Development of organic farming. - Training of aquaculture enterprises workers. - Application of new technologies – recirculation systems. 	<ul style="list-style-type: none"> - Enhanced competition in the international markets. - Proliferation of infectious diseases among fish in the aquaculture ponds.
Luxemb.	-	-	-	-
Malta	<ul style="list-style-type: none"> - good geographical location in relation to tuna migration. 	<ul style="list-style-type: none"> - Maastricht requirements on public finances imply that budget available for fisheries is limited, small size of the sector prevents achieving economies of scale, - limited areas suitable for location of fish farms, high costs of imported materials. 	<ul style="list-style-type: none"> - Relocation of installations further off-shore will increase available space and production. 	<ul style="list-style-type: none"> - Crowding in seas around Malta – competition for space and consequent pollution, - global warming affects feasibility of tuna fattening project.
Netherlands	<ul style="list-style-type: none"> - Relatively good product - Comparative advantages on the market 	<ul style="list-style-type: none"> - Small sector - Dependence on raw materials - Limited ability to invest - Lack of initial risk capital 	<ul style="list-style-type: none"> - Demand for fresh products - Sustainability (application of closed systems) - Diversification of production systems - Development and dissemination of knowledge - Market development 	<ul style="list-style-type: none"> - Competition from cheap labour countries
Poland – trout	<ul style="list-style-type: none"> - advantageous ownership structure of the sektor - good cooperation between trout producers and processing enterprises - stable profitability enabling investments - high stage of mechanization of production - good cooperation with scientific centres - experienced personnel and engaged in further development of the sector 	<ul style="list-style-type: none"> - limited accessibility to waters and areas available for rainbow trout culture - high need of capital for investments - weak cooperation between fish farmers under fish producers organizations 	<ul style="list-style-type: none"> - big, still increasing and profitable export - accessibility of financial aid from structural funds for development of the sector and fish market - development and accessibility to new culture technologies - increasing interest for products from trout in the country and abroad - trout as effective raw material in fish processing - increasing demand for stocking material 	<ul style="list-style-type: none"> - easy transfer of fish diseases between fish farms - deteriorating balance of water in the country
Poland - carp	<ul style="list-style-type: none"> - traditional and pro-ecological character of carp culture in earthen ponds - easy diversification of production (new species, stocking material) - development of farmers cooperation aimed at promotion of carp consumption - high level of scientific centres - experienced personnel and engaged in further development of the sector 	<ul style="list-style-type: none"> - concentration of fish sale during Christmas Eve period, not stable sale during the whole year - high need of capital for investments - not finished process of carp farms privatization - high and increasing costs on maintenance earthen pond in good technical state - high losses in fishy stocks caused by fish eating animals 	<ul style="list-style-type: none"> - pro-ecological character of fish production - accessibility of financial aid from structural funds for development of the sector and fish market - possible diversification of new sources of incomes (agrotourism, put-and-take fisheries, catering business) - traditional character of dishes from carp - high value of non-productive values of carp ponds (water retention, protection of 	<ul style="list-style-type: none"> - dishonest competition in fish trade - production subjected to domestic market - easy transfer of fish diseases between fish farms - deteriorating balance of water in the country

		<ul style="list-style-type: none"> - carp as less attractive species for processing - weak cooperation between fish farmers under fish producers organizations 	biodiversity, landscape etc.)	
Portugal	<ul style="list-style-type: none"> - High <i>per capita</i> consumption of fisheries products - Production mostly orientated for human consumption - Natural conditions for the development of offshore aquaculture - Transformation industry well suited for traditional and artisanal products destined for quality markets - Highly integrated tuna and sardine industry - Knowledge of fishing areas and tradition in the sector - Abundance of diverse resources and of pelagic species used in the transformation industry - Adequate fishing fleet - Ongoing applied research and abundance of qualified specialists - Abundance of port and educational infrastructures throughout the territory - Extensive Exclusive Economic Zone (EEZ) 	<ul style="list-style-type: none"> - Low investment by producers in commercialization of own products and inefficient organization and consequent representation - High production costs - High age average and deficient operational conditions in some segments of the fleet - Vulnerability of some stocks due to ecosystem frailty, strong exploitation and migratory aspect of target species - Aquaculture production limited to species which are subjected to strong external competition - Large number of family owned enterprises with low management, investment and innovation capabilities - Low literacy levels in the majority of the sector - Strong dependence on external markets for sales and supplies, especially for the insular regions - Low appeal for young people and difficulty in recruiting labour - High dependency on tuna who's abundance is dependent random variables such as migration routs (insular regions) 	<ul style="list-style-type: none"> - Increased value of fisheries products through increased quality and certification - General population with strong connection to the sea and maritime activities - Modernization of the fleet through the introduction of new technologies (safety, environmental and reducing energy use) - Increase of protected marine areas to safeguard resources and develop complementary activities to commercial fishing - Increase of scientific knowledge on fisheries and the sea - Increased demand for fisheries products, pre-cooked and others - Potential increase for aquaculture production - Costal zone planning creating more conditions for the development of aquaculture - Supply of safe products, sustainably manufactured and with high quality levels 	<ul style="list-style-type: none"> - Increase of production costs, especially fuel - Reduced access to traditional fishing grounds, especially abroad - Age of fleet - Increased age average of professional because of low interest from younger population - Increased competition levels due to lack of resources, which especially reflects in the acquisition of products for the transformation industry - Strong competition from countries with low labour costs and low environmental requisites - Impact of climate change and pollution on the water quality and resources
Romania	<ul style="list-style-type: none"> - Production capacities; - Tradition; - Well trained technical staff; - Aquatic resources. 	<ul style="list-style-type: none"> - Limited access to bank loans; - Cumbersome procedures in accessing funds ; - Insufficient investments; - Insufficient technical equipments and obsolete installations; - Poor organization of the producers; - Defective management; - High level of fees (lease, power, water etc.); - Low diversity of the fishing products; - Low added value; - Unfinished privatization process; - Defective implementation of research 	<ul style="list-style-type: none"> - Domestic demand for fish and fish products; - Financial support of the producers; - Potential for the implementation and development of sea aquaculture; - Conditions for the acclimatization and breeding of new species; - Potential for the development of organic aquaculture; - Protected natural areas for fish hatching and feeding; - Use of available areas for aquaculture (currently used for different purposes); - Potential for rural tourism and ecotourism. 	<ul style="list-style-type: none"> - Competition on the European Union market for specific products; - Consumers choosing other products; - Lack of interest of the new investors in the sector; - Environmental degradation.

		<ul style="list-style-type: none"> outcomes; - Inadequate labor conditions; - Low competitiveness. 		
Slovakia	<ul style="list-style-type: none"> - Use of the restocking material only from licensed farms, - territory is free of infections, - multifunctional utilization of fish farming facilities, - sufficiency of processing capacities complying with the current EU standards. 	<ul style="list-style-type: none"> - Stagnating production system of farms as a result of deteriorating infrastructure and technological equipment and increasing siltation of water areas used for fish farming, - Absence of IT (hardware, software) needed to keep zootechnic records; - Unresolved ownership relations of plots under the water areas used for fish farming; - Lack of financial resources; - Insufficient interconnection between research and practice; - Absence of life-long learning; - Poor promotion of aquaculture products; - Thin assortment of products. - Usual problems of micro enterprises. 	<ul style="list-style-type: none"> - Strengthening of genetic resources; - Introduction of new species; - Integration with tourism; - Direct sale at the farm; - Processing of new species; - Healthy food-stuff. 	<ul style="list-style-type: none"> - Damages by protected predators; - Increased costs resulting from NATURA 2000; - insufficient research; - Charges for water inlet for the fish farmers as part of the implementation of the EU Water Framework Directive and integrated river-basin management; - Low state support; - new diseases; - low fish consumption; - competition from cheap imports
Slovenia	<ul style="list-style-type: none"> - Good quality and abundance of the inland waters; - Breeding of different fish species – indigenous and non-indigenous; - Existence of selling and processing in fish farms; - Continuity of quality and supply to the market; - Controlled fish breeding in fish farms enables complete traceability; - Good interconnection of aquaculture and recreational fisheries (for e.g. restocking). 	<ul style="list-style-type: none"> - Obsolete infrastructure; - Low fish; - Small production units - Poor recognition of Slovenian fish and bivalve molluscs - Damages by predators - Very vulnerable marine environment - High cost of the labour - Insufficient cohesion of the sector - Insufficient professional education - Difficult control over fish diseases in fish farms built on open waters - International competition. 	<ul style="list-style-type: none"> - Possibilities to increase production - Breeding of new fish species - Bigger interconnection of the sector - Promotion - Introduction to new sales techniques - New technologies (recycling/water purification systems) - Favourable influence of extensive carp ponds breeding systems on water regime - Possibility of shifting to organic and environment-friendly aquaculture production. 	<ul style="list-style-type: none"> - International competition - Environmental pollution - Endangered water habitats - Global warming - Occurrence of new diseases - Negative publicity - Tension of the environmental legislation
Spain	<ul style="list-style-type: none"> - There exists by now some critical mass in the business structure of the sector. - There is a good relative position in terms of advances on scientific knowledge and technological adaptation. - Quality products are offered to the consumer, who has a significant level of appreciation. - There is an already consolidated tradition of sea products commercialization in Spain. 	<ul style="list-style-type: none"> - The sector presents a pronounced level of business segregation. - The presence in foreign markets is still limited. - The main comparative advantages in the initial processes have already been exploited. - There is a high market penetration of imported products. 	<ul style="list-style-type: none"> - There is a quite important characteristic market of marine origin products. - There exists more easiness for the opening of new markets in the globalization circumstances. - There exist privileged financing lines as an emergent sector. - Possibility for defining new regulation frames with some margin, as the development process of the sector is in the initial phases. 	<ul style="list-style-type: none"> - Growing international competition. - Easiness for the technology transfer, which can attract new competitors. - Possible divergences among regulatory administrations (autonomous, state...). - Possibility of relatively radical business movements on the search of privileged sources of rents in moments of startup or settlement (disputation for locations, sector or place disaffections, etc.). - Environmental mismatches and conflicts

			<ul style="list-style-type: none"> - Possibility for an advantageous adaptation to the environmental requirements, by means of the appropriate differentiation of the product (trazability, ecolabelling). 	<ul style="list-style-type: none"> - of uses. - Drifts on scientific advances and uses of genetic modifications.
Sweden	<ul style="list-style-type: none"> - Wealthy local market - Artic char is a high price species - Good fish health status compared to other countries 	<ul style="list-style-type: none"> - Negative environmental impact - Lack of venture capital - Lack of breeding programmes - Inferior natural geographical conditions compared to competitors in other countries 	<ul style="list-style-type: none"> - Niche products implies higher price - Weak wild stocks increase the interest for aquaculture - Increased demand for leisure time fishing opportunities gives higher demand for put and take fish - Development of environmental friendly production methods - High availability of fresh water areas suitable for aquaculture - Improved cooperation between authorities - Good natural conditions on the West coast for farming of mussels and oysters 	<ul style="list-style-type: none"> - Higher fodder prices - Competition for attractive water areas - Wild predators - Eutrophication in seas and lakes obstructs the expansion and development
United Kingdom	<ul style="list-style-type: none"> - Shellfish farming requires limited inputs - Continuity of quality and supply - Large domestic market for fish and shellfish products - Markets are well established (salmon, trout, mussels, oysters) - Health benefits of some products are documented (e.g. omega-3 fish oils), increasing their marketability - Premium brands (e.g. Scottish salmon, Whitstable oysters, Conwy mussels) - Controlled farming systems allow for full traceability of product - Fish are the fastest growing component of the protein food market; potential for further growth - Organic production standards are already established for some finfish species (e.g. salmon, trout, cod) and more recently for bivalve molluscs. - "High aquatic animal health status allows controls that help reduce the likelihood of introduction and spread of diseases." 	<ul style="list-style-type: none"> - Reliance of sector on wild-caught species for fish feed - Dependence on wild-caught spat for culture of some species of shellfish (environmental impact; leaves the sector vulnerable to variation in spatfall) - Disease control can be difficult in open systems; lack of licensed medicines - Job numbers created may be relatively low; there is a skill and labour shortage - Some media reports have portrayed a negative image of farmed fish - Product quality standards could be better developed for the shellfish sector - Environmental, water quality and animal welfare issues - Sector feels over-regulated - Industry associations do not represent all producers - The management of predation problems has the potential to conflict with conservation objectives - Lack of local processing - Expense of onshore facilities such as recirculation systems, and lack of sites in some areas - It can take significant time to establish 	<ul style="list-style-type: none"> - The farming of new species, both indigenous and non-indigenous - High consumer demand for both finfish and shellfish - Better representation and marketing likely to boost sales - The formation of strategic marketing links will benefit the aquaculture sector as a whole - New technology, such as full recirculation systems for finfish, has the ability to significantly mitigate environmental impacts - New technologies can be applied to production nutrition, health and reproduction - Reliance on fishmeal for feed may be reduced through better utilisation of by-products and trimmings and technological advances and the availability of more vegetarian feeds - Application of quality management techniques - Potential for aquaculture in new areas (e.g. opportunities further offshore) - Water quality may be improved through culture techniques (e.g. bivalve mollusc 	<ul style="list-style-type: none"> - Availability, sustainability and quality of fish meal, oil and other feed ingredients (considerable fishing pressure on the industrial fisheries) - Water quality deterioration (though should improve under Water Framework Directive) - Disease and parasites/availability of disease control – relevant to all farmed species - Transmission of disease (in both directions) between farmed and wild stocks - Impact on wild stocks of sea trout and salmon - Resource competition and conflict (e.g. with tourism) - Constraints on environmental carrying capacity of inshore waters to support cage fish farming - Inadequate Environmental Impact Assessment of sites - Competition from other sources (internationally) which may have cheaper and more efficient means of production - Climate change may alter water temperature profiles affecting viability of

		farms and may require high capital investment - Limited number of funders of research and development in comparison to other animal production industries	cultivation) - Consultation with NGOs and other environmental groups on siting/impacts of aquaculture businesses can mitigate environmental concerns - Requirement to meet environmental standards and greater sustainability should lead to better saleability	producing some species - Non-native introductions and associated impacts including competition and disease transmission - Illegal gathering in shellfish beds - Mobile gear fishers (mariculture) - Customer base may react negatively to media representation of the sector
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ANNEX 10. SUMMARY OF THE LITERATURE SURVEY BY COUNTRY

CZECH REPUBLIC

Number of documents in native language: 19

Number of documents in other languages: 3

Aquaculture in general

Most documents included in the literature database are focused on the general description of the sector. National Strategic Plan for the Fisheries Sector for the Period 2007 – 2013 contains a very detailed description of the industry including SWOT analysis of the industry and its development.

The Ministry of Agriculture of the Czech Republic publishes annually “Commodity Study: Fish”, which includes up-to-date information on the fisheries sector.

Furthermore, the literature database includes the articles concerning the aquaculture published in specialized magazines.

Economic performance and socio-economic role

It wasn't possible to create detailed analyses concerning the economic situation of the enterprises in the sector due to lack of suitable data. Documents in the literature database contain mostly only general description of the economic performance of the sector.

Studies focused on the socio-economic role were not identified as well. One aspect often mentioned in collected studies is aquaculture support of an employment in the rural areas. This role is very important on the micro-regional level, even though the number of persons employed in aquaculture sector is not high.

Physical and technical reviews

Research Institute of Fish Culture and Hydrobiology carries out applied research projects focused on reproduction, introduction of new fish species and new breeding technologies as recirculation systems etc. Nevertheless, these studies are not included in the literature database as they are not aimed at the economic aspects.

List of documents

- 1) *National Strategic Plan For the Fisheries Sector for the Period 2007 – 2013*, Prague, 2007.
- 2) *OPERATIONAL PROGRAMME FOR FISHERIES 2007- 2013*, Prague, 2007.
- 3) *Commodity Study: Fish*, Prague, 1999 (in Czech).
- 4) *Commodity Study: Fish*, Prague, 2002 (in Czech).
- 5) *Commodity Study: Fish*, Prague, 2003 (in Czech).
- 6) *Commodity Study: Fish*, Prague, 2005 (in Czech).
- 7) *Commodity Study: Fish*, Prague, 2006 (in Czech).
- 8) *Commodity Study: Fish*, Prague, 2007 (in Czech).
- 9) Šilhavý V., 2003: *Production and utilization of fish in the Czech Republic*, 2004 (in Czech).
- 10) Šilhavý V., *Production of market fish by the members of The Czech Fish Farmers Association in the year 2004, 2005* (in Czech).
- 11) Přebík O., *Fish and fish ponds in the Czech Republic*, 2004 (in Czech).
- 12) Šilhavý V., *Present of the Czech fish pond farming*, 2001 (in Czech).
- 13) Winkel S., *Impact of volume of carp production on the price and economics of the Czech fish pond farming*, 2004 (in Czech).
- 14) Filistein J., *Fish farming in the Czech Republic*, 1996 (in Czech).
- 15) Šilhavý V., *Priorities of the Czech fish farming*, 2004 (in Czech).
- 16) Šilhavý V., *A scene of the Czech fish farming industry*, 1999 (in Czech).
- 17) Berka R., *The ways of the Czech fish farming*, 1998 (in Czech).
- 18) Vácha F., *Fish and fishery in the Czech Republic and European Union*, 2001 (in Czech).

19) Vácha F., *EU structural measures and Czech aquaculture development*, 2002.

DENMARK

Number of documents in native language: 10

Number of documents in other languages: 6

Aquaculture in general

Document 1-3, from the Danish Ministry of Food, Agriculture and Fisheries is reports from Committees on freshwater, marine, and shellfish aquaculture in Denmark, and how to develop these in the future. The Committees work has been used in the Danish EFF Program and Strategy.

Document 4 and 5, from the Danish Ministry of Food, Agriculture and Fisheries is the Danish Program and Strategy for development of the Danish Fisheries and Aquaculture sector (EFF Program and Strategy). There has been no new development since the implementation of EFF Program and Strategy.

Document 9 is the Danish Aquaculture Account Statistic. The Aquaculture Account Statistic reports yearly economic account data on costs, earnings and balance sheet, on both farm and firm level for the entire Danish aquaculture sector. Available years are 2004 – 2007.

Economic performance and socio-economic role

Document 6 and 7, is a socio-economic assessment for building a marine farm, with a capacity of 5,000 tons per year, and a freshwater farms, with a capacity of 3,000 tons per year. In both cases, the conclusion is that it has a positive socio-economic effect to build new aquaculture farms.

Document 10 is an operational cost analysis based on budget from new re-circulating freshwater farms in Denmark. The conclusion is that the new farms are able to produce more fish to a lower cost per kilo than traditional farms.

Document 8 and 11 – 16 are all fish market studies. The question of, how the market for trout, seabream and seabass reacts to increasing supply and demand are discussed in document 8, 11, 12 and 15.

Document 13, 14 and 16 are also studies related to the fish market and industry, discussing sustainability (“ecological footprint”), market globalization effect on aquaculture in Asia and Industries involvement to control products to satisfy consumers on the retail market.

Physical and technical reviews

A technical report has just been finalized and published in the end of 2008, where the biological results from the first 2 years of production, in the new re-circulated fresh water farms, are reported. The conclusion is that the farms are a biological success and they have lived up to the expectation on reduction of phosphor, nitrogen and organic material.

- 1) Ministry of Food, Agriculture and Fisheries, *Report from the Committee on development opportunities for freshwater Aquaculture*, Ministry of Food, Agriculture and Fisheries, Copenhagen, 2002 (in Danish)
- 2) Ministry of Food, Agriculture and Fisheries, *Report from the Committee on development opportunities for marine Aquaculture*, Ministry of Food, Agriculture and Fisheries, Copenhagen, 2003 (in Danish)
- 3) Ministry of Food, Agriculture and Fisheries, *Report from the Committee on development opportunities for shellfish Aquaculture*, CF Grafisk, Copenhagen, 2004 (in Danish)
- 4) Ministry of Food, Agriculture and Fisheries, *Program for development of the Danish Fisheries - and Aquaculture sector (EFF Program)*, Ministry of Food, Agriculture and Fisheries, Copenhagen, 2007 (in Danish)

- 5) Ministry of Food, Agriculture and Fisheries, *Strategy for development of the Danish Fisheries - and Aquaculture sector (EFF Strategy)*, Ministry of Food, Agriculture and Fisheries, Copenhagen, 2007 (in Danish)
- 6) Kohl M., *Marin Farms*, Environmental Assessment Institute, Copenhagen, 2006 (in Danish)
- 7) Kohl M., *Trout production in Danish Aquaculture*, Environmental Assessment Institute, Copenhagen, 2007 (in Danish)
- 8) Mapp, *Market oriented flexible trout production*, VIFU project paper no. 2-2005, Aarhus, 2005 (in Danish)
- 9) Nielsen R., Nielsen V.L. and Westh H.K.R., *Aquaculture Account Statistics 2005*, Institute of Food and Resource Economics, Copenhagen, 2006 (in Danish)
- 10) Nielsen V.L. and Westh H.K.R., *Operational cost analysis of re-circulated freshwater farms*, Institute of Food and Resource Economics, Copenhagen, 2006 (in Danish)
- 11) Nielsen M., Jarno Vitanen, Jari Setälä, Jukka Laitinen, Kaija Saarni, Asmo Honkanen, *Delineation of Finnish fish markets - interactions between wild and farmed fish species*, Portsmouth, Storbritannien, 2006, IFFET conference paper.
- 12) Nielsen M., Jarno Vitanen, Jari Setälä, Jukka Laitinen, Kaija Saarni, Asmo Honkanen, *Integration and causality in demand - farmed trout in Germany*, Portsmouth, Storbritannien, 2006, IFFET conference paper.
- 13) Roth E., H. Rosenthal, P. Burbridge, *A discussion of the use of the sustainability index: "ecological footprint" for aquaculture production*, Aquatic Living Resources 13 (2000) p. 461-469.
- 14) Roth E., *Does globalization of markets influence the Aquaculture challenge in Asia?*, p. 129-139. ACP-EU Fish.Res.Rep., 2002. Proceedings of the ASEM Workshop AQUACHALLENGE, Beijing April 27-30.
- 15) Roth E., *Study of the market for aquaculture produced seabass and seabream species*, Report to the European Commission DG Fisheries, Final Report 23rd April 2004, Department of Marketing & Institute of Aquaculture University of Stirling, (Partner contributing on Denmark, Sweden and Finland).
- 16) Roth E., Harald Rosenthal, *Fisheries and aquaculture industries involvement to control product health and quality safety to satisfy consumer-driven objectives on retail markets in Europe*, Marine Pollution Bulletin 55 (2006) 599-605

FINLAND

Number of identified studies and other documents

Number of documents in native language: 2

Number of documents in other languages: 4

Aquaculture in general

Aquaculture 2007 is an annual statistical publication of aquaculture production. Aquaculture statistics has been published in an official statistic publication since 1987.

Economic performance and socio-economic role

Regional Fisheries in Finland includes information on aquaculture production, profitability and employment in 1998.

Regional socio-economic importance of fisheries in Finland presents socio-economic dependency of fishery including aquaculture at regional level.

Multiplicative Effects of the Fisheries industry in Finland: An Input-Output Approach presents multiplicative effects separately for aquaculture.

List of documents

1. *Aquaculture 2007*. Finnish Game and Fisheries Research Institute. SVT Agriculture, Forestry and Fishery 2008.
2. *Regional Fisheries in Finland*. Finnish Game and Fisheries Research Institute. SVT Agriculture, Forestry and Fishery 1999:10.

3. Virtanen, J., Ahvonen, A., Honkanen, A. 2001. *Regional socio-economic importance of fisheries in Finland*. Fisheries Management and Ecology 8(4-5): 393-403.
4. Virtanen, J., Setälä, J., Saarni, K. and A. Honkanen. 2003. *Multiplicative Effects of the Fisheries industry in Finland: An Input-Output Approach*. Proceeding in XV-EAFE-conference

FRANCE

Number of identified studies and other documents

The number of selected studies and other documents is 19, including 11 in French and 8 in English.

Aquaculture in general

Studies about aquaculture in general firstly refer to the different censuses which have been carried out by the French Central Department for statistical and economic studies (SCEES) in co-operation with the DPMA. The bivalve farming census (3) and the fish farming census (11) provide in-depth and exhaustive pictures of the concerned sector, but need to be updated. The census has been operated again for fish farming in 2008, but the publication of the results is not yet available (it is expected to be ready by the end of 2009). The studies published by Observatory of AGLIA which surveys fisheries and aquaculture activities in the Gulf of Biscaye area are also worth mentioning. A synthesis of the main socio-economics trends occurred during the period 1997-2007 is available (10). Other general aquaculture studies relate to exercises of prospective which have been conducted by national research institutes: Outlooks about marine fish farming (12), and Scenario for French fish farming to 2021 (16).

Economic performance and socio-economic role

More economic studies cover different subjects such as i) economic performance, ii) market and consumption, iii) “concession” allocation system in the bivalve farming sector and iv) assessment of the sustainability in fish farming.

i) Studies focusing on economic performance are very few. As concerns the economic performance of fish farming, we can only refer to the study carried out by the Stirling University about the European seabass and seabream market (2004). A study was carried out by French fish producers since then (in 2007), but remains confidential. As concerns the bivalve farming sector, all the existing economic studies are one-off, regional studies, and only cover some areas (references 1, 2, 6).

ii) Market-oriented studies concern the analysis of the bivalve consumption (9), but above all the analysis of the demand for farmed fish (references 13 & 14 & 15). The above mentioned publication of AGLIA (10) also provides elements on market and consumption trends.

iii) Publications about the allocation system of “concession” for oyster and mussel farming in France deal with both the institutional aspects of the issue and the analysis of the enterprise strategies as regards concession acquisition and transferring (References 4, 5, 6, 7). Main findings are related to the assessment of the consequences of the emerging use right market on the collective and individual management of public maritime grounds (land concentration, increase in land access costs, negative environmental impacts ...).

Physical and technical reviews

Another field of research has emerged recently, around the issue of the sustainable development of aquaculture. The methodology used is based on the co-construction of indicators of sustainability (economics, environmental and social), which was applied in a preliminary approach to salmonid farming sector in Aquitaine (17) and then to the Mediterranean seabass and seabream aquaculture sector (18). Most recent programs of sustainability assessment have associated professional and research stakeholders. IDAQUA is a project conducted by the French fish farming organisation (CIPA) which just ended at the

end of 2008 (the final report is not yet published). In addition to indicators of sustainability, the sustainability of the sector has been analysed through life-cycle assessments. EVAD is another program, more research-oriented, aiming at assessing the sustainability and governance of different systems of aquaculture (from very extensive, traditional to more intensive systems). This program, which also ended at the end of 2008, generated different publications, among which the “guide to the co-construction of sustainable development indicators of aquaculture” is identified in the list (19).

List of reports and publications

Shellfish farming

1. Cepralmar, *The bivalve mollusc farming sector in Languedoc-Roussillon: economical and financial evolution of the companies*, Agera 34 Région Languedoc-Roussillon, 1994-1998 (in French).
2. Rey H., Arcella L., Dabat M.H. *Diagnosis and macro-economic analysis of the bivalve farming in Etang de Thau*, Région Languedoc-Roussillon /CEP, final report, 1997 (in French)
1. 3.Girard S., Pérez Agúndez J.A., Miossec L., Czerwinski N., *Census of the bivalve molluscs sector in 2001*, Agreste Cahiers Conchyliculture, Numéro 1, 2005 (in French)
3. Mongruel R., Girard S., Pérez Agúndez J.A. & Bailly D., *Analysis of the strategies towards the utilization of the public maritime grounds: the case of the concessions of bivalve farmers*, Final PNEC report, CEDEM / UBO & Maritime Economic department, IFREMER Brest, 2006 (in French)
4. Mongruel R., Thebaud O., *Externalities, institutions and the location choices of shellfish producers: the case of blue mussel farming in the Mont-Saint-Michel bay (France)*, Aquaculture Economics and management, 2006 (in English)
5. Mongruel R., Pérez Agúndez J.A, *Comparing economic dynamics of oyster and mussel farming, with particular emphasis on their profitability : An application in the Mont Saint Michel Bay (France)*, Proceedings of the 13th biennial conference of the IIFET, Portsmouth, UK, 2006 (in English).
6. Mongruel R., Pérez Agúndez J.A, Girard S, *Transferable rights to produce : The market for shellfish farming concessions in France and its unintended effects*, Economie rurale, Number 306, 2008 (in French)
7. Gouletquer P., Le Moine O., *Shellfish farming and coastal zone management (CZM) development in the Marennes-Oleron bay and Charentais sounds (Charente-Maritime, France): a review of recent development*, Aquaculture International, 2003 (in English)
8. Girard S., Mariojouis C., *French consumption of mussels and oysters analysed within the European market*, Aquaculture Economics & Management, volume 7, Numbers 5 & 6, 319-333, 2003 (in English).
9. Bigot J.F., Le Bihan V., Perraudeau Y., *Socio-economic studies about fisheries and aquaculture in the AGLIA regions (1997-2007)*, Observatory of fisheries and aquaculture for the Gulf of Biscaye, AGLIA, 2008 (in French)

Fish farming

10. Agreste, *Census of the French fish farming sector in 1998 : salmonids and marine fish farmig*. Agreste données chifffées, 2000 (in French)
11. Gérard A. et al, *Marine fish farming sector: outlook*. IFREMER, Direction des programmes et de la stratégie, Ifremer, 2006 (in French)
12. Girard S., (coordinator), *Methodology for seafood markets with the aim of introducing new aquaculture project*, Final report of the European concerted action Fair CT98-3500, 2002 (in English)
13. Girard S., *Analysis of potential outlets for tropical red drum in European markets: evolution of the European fish imports and competition conditions*, Ifremer, Ministère outre-mer, 2007 (in French)
14. Girard S., Mariojouis C., *What is the demand for farmed fish on the European market?* Proceedings of the 14th biennial conference of the IIFET, Nha Trang, Vietnam, 2008 (in English).
15. INRA, *Scenarios for French fish farming to 2021*, INRA Fish Commission, 2007 (in English)
16. Madec P., *Surveying the sustainability of trout farming in Aquitaine*, final synthesis, INRA, 2003 (in French)
17. Mathe S., Rey-Valette H., Brunel O., Clement O., René F., Blancheton J.P., *Analysis of indicators for the sustainable development of the aquaculture sector*, Centre d'études et de projet Montpellier, 2006 (in French)

18. Lazard Jerome (coordinator), *Guide to the co-construction of sustainable development indicators of aquaculture*, Research project EVAD (Assessment of the sustainability of aquaculture production systems), 2008

GERMANY

Number of documents in native language : 41

Number of documents in other languages: 01

Aquaculture in general

Documents No. 05, 11, 13, 31, 33 and 41 deal with aquaculture in general.

No. 05 refers to the occurrence of fish diseases VHS and IHN. It is up to date. No. 31 and 33 deal with different aspects of carp aquaculture, including the impact of the eastern enlargement of the EU and of the international biodiversity conservation. They are both not up to date. No. 13 deals mostly with new developments in aquaculture, e.g animal protection and ecologically friendly production of trout in recirculation systems, new technologies, etc. It is up to date. No. 41 shows the state of trout-aquaculture in 2003 referring to all aspects of health care and impact on water and fauna. This is being compared to eco-products. This document is not up to date but the quality of trout aquaculture has not changed significantly and only improved further. No. 11 is a study for GTZ on the accordance of German aquaculture regulations and practices with the FAO code of conduct for responsible fisheries and their transfer potentials. It was delivered in 2003 and is not up to date.

Economic performance and socio-economic role

Documents no. 01, 03, 04, 06, 07, 08, 09, 10, 12, 14, 16, 19, 20, 21, 22, 23, 24, 25, 27, 28, 30, 35, 36, 37, 40 and 42 deal with economic performance and socio-economic role of aquacultures.

No. 01, 03, 14, 16, 22, 23, 24, 28, 40 and 42 refer to economy of aquaculture in general and for carp and trout farms specifically. No. 28 is about possible present and future economic problems of German fisheries and aquaculture in the context of EU markets and policy. It is not up to date. No. 01, 03, 23 and 24 deal with the economy and profitability of an aquaculture. No. 1, economy in general, is partly outdated. No. 03 is an annual publication of aquaculture production and market statistics with a focus on carp but has not been published since 2005. No. 23 and 24 refer to small carp aquacultures in Bavaria and their prime production costs. These papers are not up to date. No. 14, 16, 19, 20, 21, 22 and 25 deal with the situation and impacts and possibilities of improvement for carp farms. No. 16, 19, 20 and 21 explain the economic development of German (no. 16) and Saxonian carp farming, showing a negative trend, whereas no. 42 refers to carp farms in Germany and eastern European countries and possibilities to improve the competitive situation of Saxony carp farms. The situation has not changed significantly. No. 25 shows the growing importance of direct marketing for Bavarian carp aquacultures as a possibility to stabilize income and no. 14 suggests marketing concepts for a specific Bavarian carp type. No. 22 explains the negative impacts of agri-environment schemes on the profit of carp farms. All three papers are not up to date, changes took place.

No. 40 refers to trout farming and describes the possible negative economic impacts of German tightening initialized by statutory provisions of the European Union of 1999. Significant changes took place.

No. 04, 06, 07, 27, 35, 36 and 37 are national statistics on German aquaculture, especially economic performance, and evaluations/quality controls of these statistics. No. 04 consists of data on landings of German deep sea and inshore fishery of 2005 and covers mussel production. The annual reports on German fisheries, no. 06, and agriculture policy, no. 07, give a comprehensive overview of the situation the German Fisheries and agricultural policy issues. No. 35 and 36 are the inland fishery surveys, published every ten years, concerning profit and the legal status of companies as well as the production, branches of industries, marketing, employees, etc. No. 27 and 37 refer to the concepts and the quality control of those surveys.

No. 08, 09, 10 and 12 refer to subsidy programs of the EU including their impacts on aquaculture economy. No. 08 is an ex-ante-evaluation of the EFF Program and up to date. No. 09 and 10, are final reports of FIFG programme evaluations. The STOA report, no. 12, is about the state of aquaculture in the EU member states in 1999 and its future up to 2005, and therefore not up to date.

Physical and technical reviews

No. 02, 15, 17, 18, 29, 30, 32, 34 and 38 are physical and technical reviews of aquaculture.

No. 18, 32 and 38 give an overview about recent developments in aquaculture, referring to product quality and environmental impact. No. 18 describes the status of aquaculture in the EU-15 in 1998 and its probable development, not being up to date, no. 32 explains positive impacts of sound carp aquaculture on the environment and no. 38 describes new technologies and impulses for a sustainable fish production, concerning wastewater, husbandry, EU-eco-regulations, etc. It is up to date. No. 15, 26, 30, 34 and 39 deal with recirculation systems, explaining technical requirements, developments in Germany and possibilities (no. 15, 34 and 39) as well as the marketing potentials (no. 30). All are not up to date. (2005, 2006, 2002, 1998). No. 02, 17, 26 and 29 refer to species reared in recirculation systems, their performance and improvements in technologies as well as the possibilities as an alternative to pond rearing. Species are eel (no. 26), pike-perch (no. 02) and striped bass (no. 02 and 17), shrimp (no. 29). The latest article is of 2004, therefore all are not up to date, significant changes have taken place.

List of publications

- 01 Bach P., *The Economy of aquaculture*, in: Schäperclaus W. and Lucowicz M.v., Textbook of aquaculture, Parey Buchverlag, Berlin, 1998 (in German)
- 02 Baer J., *Pike-perch and striped bass as new culture species for recirculation systems*, Fischer und Teichwirt, Nürnberg, p. 606-608, 2004 (in German)
- 03 Bundesanstalt für Landwirtschaft und Ernährung (BLE), *Carp report*, BLE Hamburg, annual publication of aquaculture production and market statistics with a focus on carp) 1999-2005 (in German)
- 04 Bundesanstalt für Landwirtschaft und Ernährung (BLE), *The deep-sea and insbore fishery of the federal republic of Germany in 2005*, Hamburg, 2005 (in German)
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- 08 COFAD: *Final report of the ex-ante-evaluation. European Fisheries Fund (EFF): Operational program 2007–2013, Federal Republic of Germany*, Tutzing, 2007, unpublished (in German) Abschlussbericht der Ex-ante-Bewertung
- 09 COFAD: *Final report on the update of the mid-term review. Common program for structural interventions in the field of fisheries and aquaculture as well as the processing and marketing of corresponding products in Germany* (outside of Objective-1-Areas 2000-2006), Tutzing, 2005, unpublished (in German) Abschlussbericht der Aktualisierung der Halbzeitbewertung
- 10 COFAD: *Final report on the update of the mid-term review. Common program for structural interventions in the field of fisheries and aquaculture as well as the processing and marketing of corresponding products in Germany* (Target-1-Areas 2000-2006), Tutzing, 2005, unpublished (in German) Abschlussbericht der Aktualisierung der Halbzeitbewertung
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 - 18 Keschka S. and Klemm R., *Economic development of Saxonian carp farming 1996 to 2004*, Fischer und Teichwirt, Nürnberg, p. 210-213, 2006 (in German)
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 - 26 Pooch H., *Concept and methods underlying the inland fisheries survey 2004*, Statistisches Bundesamt – Wirtschaft und Statistik 11/2002 (in German)
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 - 34 Statistisches Bundesamt, *Inland fisheries survey 1994*, Wiesbaden, 1995 (in German)

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- 37 Steffens W., *New technologies and impulses for a sustainable fish production*, Fischer und Teichwirt, Nürnberg, p. 295-298, 2007 (in German)
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- 41 Winkel S., *The economy of carp aquaculture*, Schriftenreihe der Sächsischen Landesanstalt für Landwirtschaft, Dresden, 2005
http://www.landwirtschaft.sachsen.de/lfl/publikationen/download/1316_1.pdf (10.11.2005)

GREECE

Number of identified studies and other documents:	4
Number of documents in native language:	3
Number of documents in other languages:	1

Aquaculture in general

In particular study nr. 4 deals with the Greek aquaculture sector in general.

Economic performance and socio-economic role

The three mentioned market studies are closely related to the economic performance of the sector.

Physical and technical reviews

Study nr. 4 gives also attention to the physical and technical aspects.

1. Anonymus, *Study of the market of seabream and seabass*, Ministry of Agriculture, Athens, 1988. (Written in Greek)
2. Anonymus, *Study of the market for aquaculture produced seabass and seabream species*, University of Stirling, UK, 2004.
3. Anonymus, *Investigation of the market of seabream, seabass and other euryaline species*, Business Architects S.A., Athens, 2006. (Written in Greek)
4. ICAP S.A., *Sector study for the marine aquaculture*. Athens, 2006. (Written in Greek)

HUNGARY

Number of identified studies and other documents:	23
Number of documents in native language:	17
Number of documents in other languages:	6

Aquaculture in general: 1, 6, 1, 10, 12, 13, 14, 15, 16, 20, 22

Economic performance and socio-economic role: 3, 2, 11, 12, 16, 17, 18, 19, 20, 21

Physical and technical reviews: 2, 5, 7, 8, 12, 23

The literature includes the studies and documents of the last ten years. There have been no changes and these documents are up-to-date.

List of documents

1. *A Multifunctional Fish Farm in a wet habitat.* (In Hungarian: Többirányú ökológiai természethasználás egy vizes élőhelyen). Aranypony Co., 2005.
2. SZŰCS I. and NÁBRÁDI A.: *A new model for aquaculture planning - Experience in the education of fishery experts.* (In Hungarian: Egy új számítógépes tógazdasági tervezési modell bemutatása - Oktatási tapasztalatok a halászati szakmérnök képzésben). In: Proceedings of the 24th Scientific Fishery Conference held in Szarvas in 2000 by the Research Institute for Fish Breeding, 2005.
3. BARDÓCZ T., SZŰCS I. and PINTÉR K. 2003: *Economic situation of the Hungarian fisheries sector.* Eurofish 3: pp. 28-33, 2003.
4. SZŰCS I.: *The economic, organisational and marketing questions of the Hungarian fishery sector.* (In Hungarian: A halászati ágazat gazdasági, szervezési és piaci kérdései). Szaktudás Kiadó, Budapest, 2000.
5. PÉTERI A. and BARDÓCZ T.: *New species potential: development of currently underproduced fish species.* In Report of the Ad Hoc EIFAC/EC Working Party on Market Perspectives for European Freshwater Aquaculture, FAO/EIFAC Occasional Paper No. 35, 2001.
6. Bardócz T.: *Farmer-tailored summary about EU and national legislations, Codes of conducts, research and workshop results,* EU FP6 SustainAqua project internal document 2007.
7. HORVÁTH L. (ed.): *Fishbiology and fish farming.* (In Hungarian: Halbiológia és haltenyésztés). Mezőgazda Kiadó, Budapest, 2000.
8. PINTÉR K. and Pócsi L.: *Fish* (In Hungarian: Hal). Mezőgazda Kiadó, Budapest, 2002.
9. PINTÉR K.: *Fishery in Hungary in 2006.* (In Hungarian: Magyarország halászata 2006-ban). *Halászat*, 100. pp. 111-116, 2007.
10. GÁBOR J.: *Fishery Operative Programme of Hungary for the period of 2007-2013.* (In Hungarian: Magyarország Halászati Operatív Programja a 2007-2013 tervezési időszakra). 31st Fishery Scientific Conference, 16-17 May, 2007 Szarvas, Hungary . Organised by the Department of Natural Resources of the Hungarian Ministry of Agriculture and Rural Development. 31st Fishery Scientific Conference, 16-17 May, 2007. Szarvas, Hungary Organised by the Department of Natural Resources of the Hungarian Ministry of Agriculture and Rural Development, 2007.
11. PINTÉR K.: *Foreign Trade of Fish Products and Fish Consumption in Hungary.* (In Hungarian: A halászati termékek külkereskedelmi forgalma és halfogyasztásunk 2004-ben). *Halászat* 98 (3), 2005.
12. SZATHMÁRY L. and TENK A.: *Fresh Water Fish Production, Trade and Profitability in Hungary.* 2nd CONFERENCE ON ACQUACULTURE ECONOMICS & MARKETING, 2002.
13. LAJKÓ I. and TASNÁDI R.: *Fundamentals of aquaculture.* (In Hungarian: A tógazdasági haltenyésztés alapjai). Agroinform Kiadó és Nyomda Kft, 2001.
14. LAJKÓ I.: *Handbook of the fishfarmer.* (In Hungarian: A halászmester könyve). Szaktudás Kiadóház, 2004.
15. TASNÁDI R.: *The history of the Hungarian fish farming.* (In Hungarian: A magyar haltenyésztés története) Agroinform, Budapest, 2002.
16. SEBESTYÉN A.: *Lack of Community Marketing and its Consequences in the Hungarian Fishery Sector.* (In Hungarian: A közösségi marketing hiánya és annak vonzata a hazai halászatban.) The presentation was given in the frame of the conference held in Szarvas on 15 May 2008 and was organised by the Hortobányi Halgazdaság Co., 2008.
17. PINTÉR K.: *Mid-term Marketing Strategy in the Hungarian Fish Farming.* (In Hungarian: Középtávú marketing stratégia a halászati ágazatban (I-II). *Halászati Lapok*, 76. 2003.
18. *Report on the Hungarian Fishery in 2006.* (In Hungarian: Jelentés a 2006. évi halászatról). Statistical Department of the Agricultural Economics Research Institute, Budapest, 2007.
19. *Report on the Operation of the Fish Farmers' National Federation and Produce Council and its Members. Results of 2006.* (In Hungarian: Jelentés a Haltermelők Országos Szövetségének és TermékTanácsának valamint tagjainak működéséről 2006. évi eredményeiről). National Federation of Hungarian Fish Farmers. Annual Report of 2006 of the Fish Farmers' National Federation and Produce Council. 2007.
20. BARDÓCZ T., SZŰCS I. and TÖLG L.: *The fishery sector in Hungary: Recent trends and future possibilities,* Eurofish (6), 2006.
21. OROSZ S., BARDÓCZ T., SZŰCS I., GRASSELI, N., KOCH, K., BÉKEFI E., PÉTERFY M. and URBÁNYI B.: *The Hungarian fisheries sector towards accession.* (In Hungarian: A Magyar halászat a csatlakozást megelőzően). PHARE publication published in the frame of the SPP 200 Programme by the National Federation of Fish Farmers in Hungary, Budapest, pp. 57, 2002.

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23. PINTÉR K.: *The fish species of Hungary. Their biology and utilisation*. (In Hungarian: Magyarország halai. Biológiájuk és hasznosításuk) 2nd edition, Akadémiai Kiadó, Budapest, 2002.

IRELAND

Number of identified studies and other documents

Number of documents in native language :6
 Number of documents in other languages: :0

Aquaculture in general

Irish aquaculture sector is comprehensively presented in the annual Status Report by BIM (nr.s 4-6)

Economic performance and socio-economic role

All publications are related to economic performance of Irish aquaculture sector.

Physical and technical reviews

Each publication touches upon issues regarding technological development and suitability of the physical conditions in Ireland for various types of aquaculture.

List of publications

1. PricewaterhouseCoopers, Review of the Irish Rope Mussel Industry, 2005
2. Review Group: Donal Maguire (BIM), Kenny Parker (DARD), Greg Griffiths (DARD), John Kelly (DAFF), Jill Dunlea (DAFF), Deirdre Kelleher (DAFF), Barry Fox (Loughs Agency), *THE RISING TIDE A Review of the Bottom Grown (BG) Mussel Sector on the Island of Ireland*, 2008
- 3-6. Ronan Browne, Bryan Deegan, Terence O'Carroll, Mark Norman, Micheal O'Kinneide, *Status of Irish Aquaculture*, editions 2002-2006

ITALY

Number of identified studies and other documents

Number of documents in native language: 11
 Number of documents in other languages: 9 (English)

Aquaculture in general

The main objective of document n°1 has been to develop a new model taking into account the contribution made by the activities of fishery and aquaculture to the development of coastal regions as well as the interrelations between these activities and components of other economic sectors of the region in question. In the document n°2 the aim was to improve the basic knowledge of the bluefin tuna industry through an economic and market survey on bluefin tuna and its farming activity. In particular, it would evaluate the opportunities of development offered by bluefin tuna farming. The analysis of the normative aspects of the international policies pertaining to the farming of tuna is combined with market and economic surveys. Its purpose is to assess the effects of the regulations imposed on the farming activities (affecting productive levels and production prices) as well as the impact which these activities have had on the quota system.

Economic performance and socio-economic role

In all of documents it is possible to find innovative management approach, because, following a path of indirect inquiry, started with a micro economic approach, from a single productive enterprise, engaged in specific contexts of economic, social, environmental and institutional relations, to a parallel comparison and a macro analysis of the national aquatic sector, (part developed and treated by the operative unit ICRAM) detecting and evaluating the impacts/effects bonds on the environment. The introduced innovation gives dynamism to the management system of each enterprise that, together with the classic firm management and economic report documents, completes and integrates them with standardized and formalized instruments of environmental communication. Other socio-economic aspects integrated by consumption pattern was considered in documents n°11, 12, 13 and 14. Model and feasibility analyses was investigated mainly in documents n° 4, 6, 7, 8 and 20.

Physical and technical reviews

A good analysis on environmental aspects of intensive aquaculture it was represented by document n°3, integrated by documents n°13, 15, 17, 18 and 19. Another innovative aspect of documents n°3 and n° 15 was the inquiry and the reclassification of the standard accountings in environmental terms.

List of documents

- 1) L. Malvarosa, V. Placenti. *Development of new tools and models to evaluate the contribution of aquaculture and fishing activities to the development of coastal areas and their socio-economic interactions with other competing sectors (PECHDEV)*. In partnership with CEMARE, UCL, ENSAR, Univ. of Nantes, Univ. of Bilbao, Univ. South Denmark. Final Report EC DG FISH QLRT-2000-02277, 2006.
- 2) M. Cozzolino, B. Marzocchi, R.F. Sabatella. *Evaluation of the impact of bluefin tuna farming on the food chain: normative, managerial and operative implications*. Final Report for Agriculture & Forestry Ministry, Rome, 2007.
- 3) M. Cozzolino, G. Salerno. *Development of Green Accounting in intensive aquaculture*. Final Report for Agriculture & Forestry Ministry, Rome, 2006.
- 4) A.A.V.V. *Streamlining production costs on the basis of technical parameters, economic and biological aquaculture facilities in Italy*. Project finalized for improving aquaculture, 152 p.; March 2005
- 5) G. Salerno. *Feasibility study and design of innovative technological systems for rearing fish in cages floating*. Project finalized for improving aquaculture, 152 p.; March 2005.
- 6) A.V.V. *Optimization techniques breeding semi-intensive/extensive in readapted valley*. Project finalized for improving aquaculture, 152 p.; March 2005.
- 7) G. Salerno. *Implementing optimal management models aimed at sustainable development of aquaculture in sardine lagoons*. Final Report for MIPAF, September 2002.
- 8) A.A.V.V. *Feasibility study for a plant offshore mariculture in Trappeto - Palermo, Sicily*. Final Report for Sicily, June 1999.
- 9) C. Iandoli, G. Salerno, M. Spagnolo. *Preliminary analysis for observatory prices of products, with particular reference to the marine species*, ICRAM, Rome, 58 p., May 1995.
- 10) G. Salerno. *Analysis of the potential development of supply for mussels in Italy* – Final Report for Ministry of Agriculture – Rome, 65 p., March 1995.
- 11) M. Cozzolino. *Study of the market for aquaculture produced seabass and seabream species*. In partnership with University of Stirling- UK. Official Report to the European Commission DG Fisheries 2004.
- 12) M. Cozzolino, C. Iandoli (2001), *Comparison of two case studies: Italy and France*, in CIHEAM – International Centre for Advanced Mediterranean Agronomic Studies- Mediterranean Agronomic of Zaragoza- IAMZ- Spain.
- 13) M. Cozzolino, C. Iandoli (2001), *Overview on product differentiation and species diversification*, in CIHEAM – International Centre for Advanced Mediterranean Agronomic Studies- Mediterranean Agronomic of Zaragoza- IAMZ- Spain.
- 14) M. Cozzolino, C. Iandoli. *Valliculture as synthesis of social, cultural, economic and environmental factors*. MARAQUA (Monitoring and Regulation of Marine Aquaculture) – FAIR contract number PL98-4300), in partnership with Napier University, New Castle (UK), (2000).
- 15) M. Cozzolino, M. Spagnolo (2005), *Green Accounting in the Aquaculture Intensive Sector*, World Aquaculture Magazine, Vol. 36, (3).

- 16) M. Cozzolino (2005), *Market interactions between fishery and aquaculture in Italy*, in *Interactions Between Aquaculture And Capture Fisheries: A Methodological Perspective*, Edited by S. Cataudella, F. Massa, D. Crosetti. STUDIES AND REVIEWS No. 78 2005. FAO, General Fisheries Commission For The Mediterranean.
- 17) M. Cozzolino, C. Iandoli (2004), L'applicazione di sistemi di gestione ambientale al settore dell'acquacoltura. I quaderni dell'acquacoltura/API. n°5.
- 18) M. Cozzolino, C. Franco, C. Iandoli, P. Molinas, M. Sacco et al. (2002), Linea guida per l'applicazione di EMAS al settore della piscicoltura. Manuali e Linee guida n°15/2002. ISBN: 88-448-0066-7
- 19) M. Cozzolino, C. Iandoli (2002), Reg. 761/2001 Voluntary scheme: application to the aquaculture sector in Italy,, "Sea-farming today and tomorrow" Special Publication n° 32, Belgium.
- 20) G. Rizzo, M. Spagnolo (1996), *A Model for the Optimal management of Sea-Bass aquaculture*, Marine Resource Economics, vol. IV, pp. 267-289. ISSN: 0738-1360

LITHUANIA

Number of identified studies and other documents

Number of documents in native language: 7

Number of documents in other languages: 0

Aquaculture in general

Agriculture and food sector in Lithuania (No. 4-7) is an annual book published by Lithuanian Institute of Agrarian Economics. One of the annual articles in this book is inland fishery, which presents an analysis of the current state of inland fishery, aquaculture and national support for aquaculture. The publication is annual.

Economic performance and socio-economic role

No. 1 - the paper deals with the importance of aquaculture production and its place in Lithuanian inland fisheries, changes in production, sales, prices and consumption of aquaculture products as well as with the competitiveness and comparative advantage of Lithuanian fish and fish products.

No. 2 - the analysis of the EU legal acts, development tendencies of organic aquaculture in the aquaculture farms, link with the development of organic agriculture are presented.

No. 3 analyze of aquaculture sector, pond aquaculture, production in re-circulation systems and eco-farming. Some figures on production costs are presented.

List of documents

1. V. Vaikutis, V. Girgždienė, *The competitiveness of pond fisheries*. Agricultural Sciences, The Lithuanian Academy of Sciences, 2006 1 (extra): 108-114
2. *Scientific reasoning of aquaculture eco-farming development program 2007-2013*. V. Vaikutis, V. Girgždienė study report, Lithuanian Institute of Agrarian Economics, 2006
3. L. Janėnas. *Aquaculture*. Lithuanian fishery: documents, facts, numbers 1918-2005, Lithuanian ministry of agriculture, 2007, p. 67-75
4. V. Vaikutis. *Inland fisheries*. Agriculture and food sector in Lithuania 2007, Lithuanian Institute of Agrarian Economics, 2008, p. 208-212
5. V. Vaikutis. *Inland fisheries*. Agriculture and food sector in Lithuania 2006, Lithuanian Institute of Agrarian Economics, 2007, p. 207-212
6. V. Vaikutis. *Inland fisheries*. Agriculture and food sector in Lithuania 2005, Lithuanian Institute of Agrarian Economics, 2006, p. 185-189
7. V. Vaikutis. *Inland fisheries*. Agriculture and food sector in Lithuania 2004, Lithuanian Institute of Agrarian Economics, 2005, p. 148-151

NETHERLANDS

Number of identified studies and other documents

Number of documents in native language	:14
Number of documents in other languages:	:0

Aquaculture in general

Most of the total production of the Dutch aquaculture sector comes from the shellfish sector (60%) and the fresh water fish farming sector. Shellfish farming has a long history in The Netherlands, fresh fish farming is a relatively new sector and policies for this sector are still being developed. There have been a number of studies implemented by the Dutch government to form a basis for policies in this sector (see references 1,2,6,7,8,9,14). Most of the shellfish farms and freshwater fish farms are situated in the province Zeeland. This province is actively stimulating aquaculture and has written an report about the opportunities for and threats to the aquaculture sector in the Netherlands (10).

Economic performance and socio-economic role

Lei has done some studies about the economic performance of both the shellfish farms and the freshwater fish farms (11,12) Some information about the economic performance of the oyster sector can be found in (13). There has been very limited research done about the socio economic impact of the aquaculture sector. This lack of literature can be attributed to the fact that this sector is really small in the Netherlands and also in case of fresh water fish farming relatively new. Some information about the socio-economic impact can be found in (6,11).

Physical and technical reviews

There have been a number of researches done regarding which species can be grown in the Netherlands and what kind of technical problems can be expected. See for example (2,5) A website www.aquacultuur.nl gives an extensive list of technical research reports done in the Netherlands.

List of documents

1. Eijk, W.H.B.J, van *Beleidsnota viskweek*. Productschap vis, Rijswijk, 2001 (in Dutch)
2. Hagendoorn, A. et.al. *Aquacultuur – een verkenning. Ervaringen in andere Europese landen en marktaspecten*. Expertisecentrum LNV, 2004 (in Dutch).
3. Kals, J., E. Schram, H. van der Mheen, A. Smaal, J. Smit, *Potential species for the Dutch aquaculture sector*, RIVO, 2005 (in Dutch).
4. Limpens, I. en R. Weterings *Aquacultuur. Sterkte/zwakte-analyse. Achtergrondstudie in opdracht van de Nationale Raad voor Landbouwkundig Onderzoek*. TNO Strategie, Technologie en Beleid (TNO-STB, Delft), 1998 (in Dutch).
5. Luiten, E., *Controversies around the growing of fish in the Netherlands?* Stichting Toekomstbeeld der Techniek, 2005 (in Dutch).
6. LNV Consumentenplatform *Vis, als het maar verantwoord is!*, Den Haag, 2003 (in Dutch).
7. Ministerie van LNV *Viskweek in Nederland. Een aanzet voor een nationale agenda ten behoeve van verdere duurzame ontwikkeling van de viskweek*, Den Haag, 2004. (in Dutch).
8. Ministerie van LNV i.s.m. Hogeschool Zeeland *Aquacultuur in het buitenland. Welke bedrijven en/of organisaties hebben huidige of toekomstige plannen om te investeren in aquacultuur in het buitenland?* Den Haag, 2004 (in Dutch).
9. Nationale Raad voor Landbouwkundig Onderzoek *Aquacultuur. Speerpunten voor actie*. Den Haag, 1999 (in Dutch).
10. Provincie Zeeland, *Aquaculture in Zeeland: The blue revolution*, Provincie Zeeland, 2006 (in Dutch).
11. Vos, B. de *Visteelt in cijfers. In: Visserij in cijfers, C. Taal, LEI Rapport*, Den Haag, 2006 (in Dutch).
12. Vos, B. de, S. Vellema, C. van der Heijden, C. de Lauwere, E. Schram en D. Stijnen *Ondernemerschap in kweekvis. Het samenspel van strategie, innovatie en samenwerking*. LEI rapport 2.05.08, Den Haag, 2005 (in Dutch).
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14. Zwieten, P.A.M *Kansen en bedreigingen voor aquacultuur in Nederland. Studie in opdracht van de Nationale Raad voor Landbouwkundig Onderzoek*, Den Haag, 1998 (in Dutch).

POLAND

Number of identified studies and other documents

Number of documents in native language: 67

Number of documents in other languages: none

Aquaculture in general

Most of identified documents deal with the status and trends characterizing fish culture in general, and especially rainbow trout and common carp farming, as well as production of various stages of stocking material introduced into running waters in Poland. 12 papers written by Bontemps (1997-2007) were prepared on the basis of approx. 140 – 160 questionnaires obtained each year from fish farms producing fish (mainly rainbow trout) in ponds. The papers present the total volume of production and sale of rainbow trout in the whole Poland, as well as in 5 distinguished regions of the country. The total rainbow trout production increased from 7000 – 7600 tons in 1996 to 16984 tons in 2006 (it was calculated on the basis of questionnaire data and assessments done on the basis of the volume of total feed sale by feed manufactures). The papers present also health status of trout farms, share of particular feed manufactures on the market, difficulties with fish sale, other fish species produced in trout farms, and “put-and-take” fisheries operating in investigated farms. 19 papers prepared by Krüger, Lirski and Myszkowski deal with the status and trends characterizing carp culture in Poland. Total production of the species increased up to 22-23 thousand tons at the end of XX and beginning of XXI century. Then stable decrease occurred, and in 2005-2006 carp production varied between 15 and 16 thousand tons. Three papers deal with fish prices, both fish to consumption and various stages of stocking material introduced into open running waters in Poland (lakes, rivers, dam reservoirs). 12 papers are focused on status of lake fishery enterprises, taking into account not only fish production, but as well volume and value of stocking material produced by aquaculture and released into open running waters.

Economic performance and socio-economic role

Only few identified papers present problems of economic performance and socio-economic role of aquaculture. A paper “Profitability of inland fish production in 2005” was made on the basis of three questioned groups of fishery enterprises: 32 trout farms, 20 carp farms, 18 “pond-lake” enterprises, and 32 “lake” enterprises. A variety of economic parameters were calculated and presented for each of the groups of enterprises, among them: income per 1 employee, gross profit per 1 employee, index of development, share of fish production, angling licences sale, and other incomes in total incomes, average prices of table fish, and the most important index – profitability. In 2005 profitability varied to a large extent: the highest index was denoted in trout farms (18%), the lowest in carp farms. In “pond-lake” enterprises and “lake” enterprises this index varied between 10.39% and 6.97%. Many of the papers (9) deal with economic condition of “lake” and “pond-lake” fisheries enterprises. Comparisons of variety calculated indexes revealed that notwithstanding the decreasing trend of lake fish production, economic status of the enterprises is rather stable. The reason of this phenomenon is high flexibility of the enterprises to develop various kinds of activities, only partly connected with fish production i.e. fish processing, tourism, catering, “put-and-take” fisheries etc. Two of the documents deal with market studies, comparing fish production and fish consumption from the main sources: inland aquaculture and fisheries, Baltic Sea fishery, fishery in oceans and import of fish from another countries (i.e. Vietnamese pangas).

Physical and technical reviews

Two documents deal with physical and technical features of fish farming. The 1st book, entitled “Trout culture. Farmer’s manual” is entirely devoted to various aspects of technologies of rainbow trout farming. The book presents wide spectrum of topics connected with trout farming, among them: history of introductions, fish farm construction, production possibilities, breeding, larvae rearing, fry and food fish

culture, prophylactics, sale, pollution caused by trout culture and methods of water purification, genetic manipulations, prices, processing, trout production in Poland in 1970-2007. The second book, entitled "Sturgeons culture. Farmer's manual" presents wide spectrum of topics connected with sturgeons farming, among them: systemetics and biology, cultured species, culture planning, influence of culture upon water quality, water purification, technology, breeding, eggs incubation, larvae and fry rearing, culture of heavy fry and table fish, culture of spawners, fish diseases, processing.

List of documents

1. Bontemps S., *Analyses of rainbow trout production and sale in 1996*, Komunikaty Rybackie, 1997, 4, 1-8.
2. Bontemps S., *Analyses of rainbow trout production and sale in 1997*, Komunikaty Rybackie, 1998, 4, 1-12.
3. Bontemps S., *Analyses of rainbow trout production and sale in 1998*, Komunikaty Rybackie, 1999, 4, 11-20.
4. Bontemps S., *Analyses of rainbow trout production and sale in 1999*, Komunikaty Rybackie, 2000, 4, 12-23.
5. Bontemps S., *Analyses of rainbow trout production and sale in 2000*, Komunikaty Rybackie, 2001, 4, 1-14.
6. Bontemps S., *Analyses of rainbow trout production and sale in 2001*, Komunikaty Rybackie, 2002, 4, 1-13.
7. Bontemps S., *Analyses of rainbow trout production and sale in 2002*, Komunikaty Rybackie, 2003, 4, 1-15.
8. Bontemps S., *Analyses of rainbow trout production and sale in 2003*, Komunikaty Rybackie, 2004, 4, 1-15.
9. Bontemps S., *Analyses of rainbow trout production and sale in 2004*, Komunikaty Rybackie, 2005, 4, 1-13.
10. Bontemps S., *Analyses of rainbow trout production and sale in 2005*, Komunikaty Rybackie, 2006, 4, 1-12.
11. Bontemps S., *Analyses of rainbow trout production and sale in 2006*, Komunikaty Rybackie, 2007, 4, 1-11.
12. Bontemps S., *Rainbow trout production in 1995*, Komunikaty Rybackie, 1996, 6, 29-32.
13. Goryczko K., *Trout culture. Farmer's manual*, 2008.
14. Kolman R., *Sturgeons culture. Farmer's manual*, 2006.
15. Krüger A., *Carp pond production in 2000 and 2001 with preliminary prognosis for 2002, based on modified methodology of survey*, Komunikaty Rybackie, 2002, 4, 30-33.
16. Krüger A., *Current problems in production and sale in carp farming*, Komunikaty Rybackie, 1996, 3, 1-2.
17. Krüger A., *Difficult year 1996 in carp culture – prognosis of production effects*, Komunikaty Rybackie, 1996, 5, 7-8.
18. Krüger A., *Pond production in 1998, based on questionnaires submitted in January '99, and production perspectives resulting from autumn volume of carp stocking material*, Komunikaty Rybackie, 1999, 2, 1-2.
19. Krüger A., *Pond production in 1999, based on questionnaires submitted in January 2000, and production perspectives resulting from autumn volume of carp stocking material*, Komunikaty Rybackie, 2000, 2, 1-3.
20. Krüger A., *Prognosis of carp pond production in 2001, based on (alarming) questionnaire data on spring stockings*, Komunikaty Rybackie, 2001, 4, 30-33.
21. Krüger A., *Prognosis of carp pond production in season 1999*, Komunikaty Rybackie, 2000, 5, 9-10.
22. Krüger A., *Prognosis of carp pond production in season 2000*, Komunikaty Rybackie, 2001, 5, 1-2.
23. Krüger A., *Results of questionnaire survey dealing with stockings in season 1998, and carp production prognosis*, Komunikaty Rybackie, 1999, 5, 24-25.
24. Krüger A., *Stockings with carp into fry ponds in 2001, based on questionnaire survey*, Komunikaty Rybackie, 2001, 5, 21-23.
25. Leopold M. Wolos A., *Assessment of the economic status of lake fishery enterprises in 1996*, Lake fisheries. Significance and management, 1997, 39-44.
26. Leopold M. Wolos A., *Assessment of the economic status of lake fishery enterprises in 1997*, Lake fisheries. Development, changes, obstacles, 1998, 29-35.
27. Leopold M. Wolos A., *Assessment of the economic status of lake fishery enterprises in 1998*, Proceeding of IV National Conference of Lake Fishery Users, 1999, 17-22.
28. Leopold M. Wolos A., *Assessment of the economic status of lake fishery enterprises in 1999*, Proceeding of V National Conference of Lake Fishery Users, 2000, 35-40.
29. Leopold M. Wolos A., *Economic status of lake fishery enterprises in 2000 on the background of parameters in earlier years*, Selected problems of inland fisheries in 2000, 2001, 19-26.
30. Leopold M. Wolos A., *Economic status of lake fishery enterprises in 2001*, Selected problems of inland fisheries in 2001, 2002, 19-24.
31. Leopold M. Wolos A., *An attempt to assess economic status of lake fishery enterprises in 1995*, Lake fisheries. Status, conditions, perspectives. 1st National Conference of lake Fishery Users Olsztyn, Poland, 1996, 43-50.

32. Lirski A., Myszkowski L., *Carp production in 2004 after spring verification, and production prognosis based on questionnaire survey*. Komunikaty Rybackie, 2005, 6, 1-4.
33. Lirski A., Myszkowski L., *Fish production in ponds and other devices used for fish culture in 2004*, Komunikaty Rybackie, 2006, 2, 1-5.
34. Lirski A., Myszkowski L., *Fish production in ponds and other devices used for fish culture in 2005*, Komunikaty Rybackie, 2007, 1, 5-10.
35. Lirski A., Myszkowski L., *Pond fish production in 2005, based on questionnaire survey*, Komunikaty Rybackie, 2006, 3, 1-4.
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37. Lirski A., Myszkowski L., *Pond fish production in Poland in 2004, based on questionnaire survey*, Komunikaty Rybackie, 2005, 2, 1-3.
38. Lirski A., Myszkowski L., *Sale of table carp in 2005 based on questionnaire survey*, Komunikaty Rybackie, 2006, 4, 12-15.
39. Lirski A., Myszkowski L., *Sale of table carp in 2006 based on questionnaire survey*, Komunikaty Rybackie, 2007, 3, 6-9.
40. Lirski A., Myszkowski L., *Production of carp and additional fish species in ground ponds in 2006, based on questionnaire survey*, Komunikaty Rybackie, 2007, 2, 1-4.
41. Mickiewicz M., *Analysis of lake stocking management in 1999*, Proceeding of V National Conference of Lake Fishery Users, 2000, 41-52.
42. Mickiewicz M., *Analysis of lake stockings in 2000. Trends of stocking management in recent years.*, Selected problems of inland fisheries in 2000, 2001, 27-48.
43. Mickiewicz M., *Average prices of food fish and stocking material used by lake fishery enterprises in 2005*, Komunikaty Rybackie, 2005, 6, 4-6.
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45. Mickiewicz M., *Characteristics of lake stocking management in 2001*, Selected problems of inland fisheries in 2001, 2002, 25-36.
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47. Mickiewicz M., *Lake stocking management in 2002 – stocking volume, their financial value and lake areas stocked with particular species*, Fisheries 2002, 2003, 17-30.
48. Mickiewicz M., *Lake stocking management in 2005 compared to stockings in 2004*, Status of fisheries management in lakes, rivers and dam reservoirs in 2006, 2006, 15-28.
49. Mickiewicz M., *Lake stocking management in 2006*, Status of fisheries management in lakes, rivers and dam reservoirs in 2006, 2007, 15-28.
50. Mickiewicz M., *Prices of table fish and stocking material in lake fishery enterprises in 2001 and 2003*, Komunikaty Rybackie, 2003, 6, 7-9.
51. Mickiewicz M., *Status of lake stocking management in 2003 and its comparison with stocking management of fishery enterprises possessing rights to fishery management in lakes in 2002.*, Status and functional conditions of fisheries in 2003, 2004, 19-34.
52. Mickiewicz M., *Status of lake stocking management in 2004 compared to 2003*, Fisheries in lakes, rivers and dam reservoirs in 2004, 2005, 15-29.
53. Mickiewicz M., Wolos A., *Characteristics of stockings performed by lake fishery users in 1997*, Lake fisheries. Development, changes, obstacles, 1998, 37-46.
54. Mickiewicz M., Wolos A., *Characteristics of stockings performed by lake fishery users in 1998*, Proceeding of V National Conference of Lake Fishery Users, 1999, 23-32.
55. Mickiewicz M., Wolos A., *Economic and financial status of fishery enterprises possessing rights to fishery management in lakes*, Fisheries management in lakes, rivers and dam reservoirs in 2005, 35-42.
56. Mickiewicz M., Wolos A., Draszkiwicz-Mioduszevska H., *Fisheries management in inland running waters in 2005. Part 2. Stockings*, Komunikaty Rybackie, 2007, 2, 5-8.
57. Mickiewicz M., Wolos A., Mioduszevska H., Wiśniewolski W., *Fisheries management in inland running waters in 2004. Part 2. Stockings*, Komunikaty Rybackie, 2006, 2, 5-8.
58. Seremak-Bulge J., *Inland fisheries*, Fish market – status and perspectives. Market analyses 2006, 5, 13-16.
59. Seremak-Bulge J., *Market, fish consumption and perspectives of their development*. 2007.

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62. Wołos A., Czerwiński T., Mickiewicz M., *Economic and financial status of fishery enterprises in 2003*, Status and functional conditions of fisheries in 2003, 2004, 35-40.
63. Wołos A., Czerwiński T., Mickiewicz M., *Economic and financial status of fishery enterprises in 2004*, Fisheries in lakes, rivers and dam reservoirs in 2004, 2005, 31-37.
64. Wołos A., Mickiewicz M., *Characteristics of stockings performed by lake fishery users in 1996*, Lake fisheries. Significance and management, 1997, 45-52.
65. Wołos A., Mickiewicz M., Czerwiński T., *Economic and financial status of fishery enterprises possessing rights to fishery management in lakes in 2006*, Status of fisheries management in lakes, rivers and dam reservoirs in 2006, 2007, 29-36.
66. Wołos A., Mickiewicz M., Lirski A., Myszkowski L., *Profitability of inland fish production in 2005*, Fisheries, angling, sustainable development, 2006, 39-54.

PORTUGAL

Number of documents in native language: 4

Number of documents in other languages: 3

Aquaculture in general

Document n. ° 1 reviews terms of use for fisheries products, including common or vernacular names. This document is up-to-date.

Document n. ° 6 gives a general overview of the aquaculture sector in Portugal. The data is from the year 2000 and, due to the present economic crisis, is outdated in what concerns production values and n. ° of active farms.

Economic performance and socio-economic role

Document n. ° 4 reviews socio-economic aspects of the communities living in the vicinity of Ria Formosa, the most productive aquaculture area in Portugal. The region is very dependent on tourism; therefore the impact of the present economic crisis will most likely alter a substantial amount of the data.

Document n. ° 5 is a yearly statistics publication regarding the fisheries sector. This is the latest publication.

Physical and technical reviews

Documents n. ° 2, 3 and 7 review technical data concerning turbot, seabass and seabream production and, in general terms, update and confirm available data.

List of documents

1. Paulo Vaz-Pires; Maria Leonor Nunes; Irineu Batista, Terminologia de Produtos da Pesca e Aquicultura, Portugal, 2004
2. Artur Lemos Duarte, A Piscicultura no Estuário do Rio Mondego. Pregado: Uma Espécie a Cultivar, Portugal, 2008
3. Artur C. Lemos Duarte; Francisco Ruano; Manuel Sobral, Policultura semi-intensiva de pregado *Psetta maxima* L. e robalo *Dicentrarchus labrax* L. em tanques de terra no Estuário do rio Mondego, Portugal, 2008
4. Dalila Serpa; Dora Jesus; Manuela Falcão; Luís Cancela da Fonseca, Ria Formosa ecosystem: Socio-economic approach, Portugal, 2005
5. Instituto Nacional de Estatística, Estatísticas da Pesca 2007, Portugal, 2008
6. Francisco Bernardino, Review of Aquaculture Development in Portugal, Portugal, 2000

7. Maria Teresa Dinis, A. Ramalho Ribeiro, J. Dias, F. Soares, L. Conceição, P. Vaz-Pires, L. Valente, Promoting The Sustainability of Extensive and Semi-intensive Coastal Aquaculture in Southern Europe, Portugal, 2007

SPAIN

Number of identified studies and other documents: 6

Number of documents in native language: 6

Number of documents in other languages: 0

Aquaculture in general

The document number 3 is a general analysis of the present time and future of the Spanish aquaculture. It is up to date, as it is relatively recent (2001).

Economic performance and socio-economic role

The documents 1, 2 and 4 are economic studies. The document 5 is a socio-economic analysis and the document 6 is a study of the applicable normative and the Administrative Management. There have been not significant changes, except for document 6, as the Ministry of Agriculture, Fisheries and Food has been integrated on the Ministry of Environment, Rural and Marine Medium.

Physical and technical reviews

None of the documents are related to physical and technical reviews.

List of documents

Merinero S., Martínez S., Tomás A., Jover M. *Análisis económico de alternativas de producción de Dorada en jaulas marinas en el litoral Mediterráneo español*. Revista AquaTIC, nº 23, 2005.

García García J., Rodríguez González L.M., García García B. *Estudio económico de una explotación tipo de engorde de pulpo (*Octopus vulgaris*) en Galicia, mediante la analítica de costes*. Revista AquaTIC, nº 21, 2004.

Coll JM. *Actualidad y futuro de la Acuicultura Española*. Revista AquaTIC, nº 14, 2001.

García Arthus E. *Reflejo contable de riesgos y contingencias propios de explotaciones acuícolas*. Revista AquaTIC, nº 11, 2000.

Vergara Martín JM. *Consideraciones socio-económicas sobre el momento actual de la acuicultura marina en España*. Revista AquaTIC, nº 10, 2000.

González Serrano JL, Delgado Nuche J, Ortiz Laseca, Encinas Escribano A. *Estado de la Normativa aplicable y de la Gestión Administrativa en el ámbito de la Acuicultura*. Revista AquaTIC, nº 9, 2000.

SWEDEN

No of identified studies and other documents: 11

No of documents in native language: 8 in Swedish

No of documents in other languages: 3 in English

Aquaculture in general

Only limited literature dealing with the Swedish aquaculture sector has been published over the years. In 2000 a government commission of inquiry on aquaculture published a report including an overview of the sector and recommendations related to the development of the Swedish aquaculture sector (*doc 5*). A similar report by another commission was published in March 2009 (*doc 6*). Also a Swedish parliament report from 2007 on the effects of the fisheries policy includes a section on aquaculture (*doc 11*). In

addition there are some reports focussing on specific species: crayfish (*doc 1*), mussels (*doc 3, doc 4 and doc 9*) and cod (*doc 2*).

Economic performance and socio-economic role

There is a profitability study available for the period 1992-99. This study also analyses the effects of the EU structural aid given to the Swedish aquaculture sector 1995-1999. (*doc 8*)

In another report from 2007 the structural aid to the Swedish aquaculture sector is described and analysed (*doc 10*).

Statistics Sweden publishes official statistics on aquaculture on a yearly basis. The statistics are readily available on the internet at www.scb.se and include parameters such as: production volume and value, geographical location, production technique and employment. The publications include glossaries Swedish-English. (*doc 7*)

Physical and technical reviews

The studies focussing on specific species (crayfish, cod and mussels) include physical and technical reviews. In particular extensive work has been carried out with regards to mussel farming and its environmental impact (eg in improving water quality).

Literature

1. Ackefors, H., *The development of crayfish culture in Sweden during the last decade*, Report, Stockholm University, 1997
2. Bailey, J.; Pickova, J.; Alanärä, A., *The prerequisites for, and potential of, cod farming in Sweden*, Finfo 2005:12, Fiskeriverket, Göteborg, 2005. (in Swedish and English)
3. Kollberg, *Description of the Swedish mussel industry*, Vattenbrukarnas riksförbund, 1999 (in Swedish)
4. Lindahl, O.; Hart, R.; Henroth, B.; Kollberg, S.; Loo, L-O.; Olrog, L.; Rehnstam-Holm, A-S.; Svensson, J.; Svensson, S.; and Syversen, U., *Improving Marine Water Quality by Mussel Farming: A Profitable Solution for Swedish Society*, Royal Swedish Academy of Sciences, 2005:2, 2005 (In Swedish)
5. Ministry of Agriculture, *Swedish aquaculture – a future industry*, Ds 2000:42, Stockholm, 2000 (in Swedish)
6. Swedish Government Official Report, *Report from the commission of inquiry on the Swedish aquaculture sector*, SOU 2009:26, Stockholm, 2009 (in Swedish, but with a summary in English)
7. Statistics Sweden, *Official statistics of Sweden, Statistical messages, Aquaculture*, JM 60 SM 9701 – 0501, 1996, 2006 (in Swedish)
8. Swedish Board of Fisheries, *Report of the profitability in the Swedish aquaculture sector – an analysis for 1992 – 1998*, 2000 (in Swedish)
9. Swedish Board of Fisheries, *Mussel farming – An industry of recirculation promoting good environment and health as well as new occupations in the archipelago*, 2004 (in Swedish)
10. Swedish Board of Fisheries, *Studies of structural aid to the aquaculture sector in light of the European Fisheries Fund 2000-2006*, Göteborg, 2007 (in Swedish, but with a summary in English)
11. Swedish Parliament, *Follow-up of the results and consequences for companies in the fisheries sector, from efforts of the fisheries policy*, Miljö- och jordbruksutskottet, Rapporter från riksdagen 2007/08:RFR3, 2007 (in Swedish)

UNITED KINGDOM

Number of identified studies and other documents

Number of documents in native language: 8

Number of documents in other languages: 0

Aquaculture in general

There are surprisingly few formal publications regarding UK aquaculture. However the sector is served by a number of periodic publications from the devolved national fisheries and aquaculture research services that provide reasonably up to date information on production and current trends and issues in UK aquaculture. For England and Wales, this includes the *Finfish News* (was *Trout News*) (see document 4) and *Shellfish News* (see document 5) that are both published by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) on behalf of the Department for Environment, Food and Rural Affairs (Defra). Both are produced twice a year and are available free from Cefas' website (<http://www.cefas.co.uk>). In both cases they include a series of articles on technical issues, announcements (e.g. new regulations, press releases, opportunities and events), research news and an 'information file' (including where to get help and advice as well as useful publications). Importantly both publications include a summary of aquaculture production data and analysis once a year. The latest versions are (i) *Finfish News* - Issue 6, Summer/Autumn 2008 and (ii) *Shellfish News* - Issue No. 26, Autumn/Winter 2008.

In Scotland, the Fisheries Research Services (FRS) produces an *Annual Production Survey* for (i) fish farms and (ii) shellfish farms. This is produced annually by FRS on behalf of the Scottish Government. These surveys collate annual production data from registered Scottish fish and shellfish farm sites and provide detailed data and information on their production, structure and employment. No economic information is provided. The latest version is the *Scottish Fish Farms Annual Production Survey, 2007* which was published in October 2008.

Economic performance and socio-economic role

There are virtually no peer-reviewed, published reports on the economic performance and socio-economic role of aquaculture in the UK, although there are many unpublished government and private sector reports. The only substantial report is a socio-economic study of the UK trout industry conducted by Nautilus Consultants for the British Trout Association in 2001 (see Document 6). There are no plans to update this study. Lantra is licensed by UK government as one of 25 Sector Skills Councils that make up the Skills for Business Network, which identifies and tackles skills gaps for each sector, including aquaculture and have produced the occasional publication on skill levels and occupational patterns for UK aquaculture (see Document 1).

Physical and technical reviews

Physical and technical reviews are included in the Cefas and FRS publications mentioned in Section 1 above. Other specific reviews include the recent investigation to assess the cost structure and competitiveness of the salmon growing industry in Scotland against that of Norway and Chile, undertaken by Poseidon in 2008 (see Report 8).

List of documents

1. Lantra, *Aquaculture Industry Occupational and Functional Map Draft Version 1*, UK, 2006
2. FRS, *Scottish Fish Farms Annual Production Survey 2006*, Aberdeen, UK, 2006
3. FRS, *Scottish Shellfish Farm Production Survey 2006*, Aberdeen, UK, 2006
4. Cefas, *Finfish News (No 5, Winter / Spring 2008)*, Lowestoft, UK, 2008
5. Cefas, *Shellfish News (No 24, Autumn / Winter 2007)*, Lowestoft, UK, 2007
6. Nautilus Consultants, *Socio-economic study of the UK trout industry*, Edinburgh UK, 2001

7. Failler, P., *Research orientations for the development of new tools and models to evaluate the contribution of aquaculture and fishing activities to the development of coastal areas and their socio-economic interactions with other sectors*. Cemare, Portsmouth UK, 2001
8. Cappell, R. and J. Hambrey, *Detailed investigation of a range of issues to assess the cost structure and competitiveness of the salmon growing industry in Scotland*, Poseidon Aquatic Resource Management Ltd, Edinburgh, UK, 2008.

