

FISHERIES SECTOR REVIEW - BULGARIA

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List of Abbreviations

| | |
|--------------|---|
| EU | European Union |
| GDP | Gross domestic product |
| PO's | Producers Organisations |
| NVS | National Veterinary Service |
| NAFA | National Agency for Fisheries and Aquaculture |
| MEWR | Ministry of Environment and Water Resources |
| MAFAR | Ministry of Agriculture Forestry and Agrarian Reform |

1 INTRODUCTION

This report provides a detailed analysis of the sector, and its sub-sectors, with additional details provided on key issues such as fisheries employment, marketing and the institutional framework. It concludes with a SWOT analysis for the fishery and aquaculture sectors.

2 FISHERIES PROFILE OF BULGARIA

Fisheries activity in Bulgaria includes marine fishing in the Black Sea (where the main commercial species is the sprat) and inland fishing in the River Danube and in rivers and lakes (both natural and artificial). There is an active aquaculture sector for warm water (carp of several different species) and cold water fish (trout). Total production of all fish was about 16,700 tonnes in 1999, as shown in Table 1. The Black Sea provides the main fisheries resource, accounting for about 50% of production in 1999.

| | Fish production (tonnes) | | | | |
|--------------------|--------------------------|----------|----------|----------|----------|
| | 1995 | 1996 | 1997 | 1998 | 1999 |
| Black Sea | 7,515.0 | 7,733.0 | 9,423.0 | 8,514.0 | 8,211.0 |
| Danube | 761.0 | 1,126.0 | 1,042.0 | 1,098.0 | 858,5 |
| Aquaculture | 2,200.0 | 3,350.0 | 4,500.0 | 5,900.0 | 7,680.0 |
| TOTAL | 10,476.0 | 12,209.0 | 14,965.0 | 15,512.0 | 16,750.0 |

(Except for 1999, aquaculture excludes trout).

Source: NAFA

Table 1: Total fish production in Bulgaria 1995 to 1999

Aquaculture and stocked lakes accounted for a further 45% and the Danube River about 5% of production. Fish production has increased since 1995, mainly due to an increase in private sector production from aquaculture. Fish processing is a significant activity, with the sea-snail (*Rapana thomassiana*), trout and reprocessing of imported raw material being important sectors.

| | Value added(€) | % of GDP |
|--|----------------|----------|
| Fisheries | 14,300,000 | 0.14 |
| Agriculture, forestry and fisheries | 1,760,889,239 | 15.12 |
| GDP | 11,645,183,886 | 100.00 |

Source: NAFA, trade interviews

Table 2: Estimated economic dimensions of the fishery sector.

It is estimated that all fisheries activities (including processing) contribute an added value of about €14.3 million¹ to the Bulgarian economy (Table 3), approximately 0.14% of GDP (by comparison agriculture contributes about 15%). This is significantly lower than the EU fisheries average of 1.2%. Fish consumption is about one third of the global average, at about 2.0 kg/per capita in 1999.

| Sector | Estimated added Value €million |
|--------------------|--------------------------------|
| Fishing | 1.5 |
| Processing | 9.8 |
| Aquaculture | 2.5 |
| Inland | 0.5 |
| Total | 14.3 |

Table 3: Estimated added value by fisheries sub-sector

¹ All values are converted to € (€ = 1.955 leva in 2000)

Therefore, although the overall picture suggests that fisheries is not of national strategic importance, there are important regional impacts due to fisheries and related activities. These demand consideration in the policy framework for the agricultural and food sector.

2.1 Marine Fisheries

2.1.1 Marine Fisheries Resources

The Black Sea coastline of Bulgaria is 378 km in length, and contains two main fishing ports (Burgas and Varna) and several smaller ports. Fishing grounds are located along the entire coast, but the central region is the main location for production of molluscs.

Production has declined significantly from reported levels that were almost double in the 1980s. The main reasons for the decline are environmental, particularly the effect of the introduction of the predatory jellyfish *Mnemiopsis leidyi* in the early 1980s, which has affected several summer spawning fish species. The Bulgarian coast is also subject to pollution from the River Danube, although water quality has reportedly improved with the decline of heavy industry in some of the countries through which the river flows.

There are two marine resources of significant commercial importance. One is the sprat (*Sprattus sprattus*) a small pelagic fish caught by mid-water trawling and ring netting. The sprat accounted for 3,600 tonnes in 1999 (44% of all marine landings including mollusc, and about 90% of the fish). The resource is considerably under-utilised, with the National Institute of Fisheries and Aquaculture reporting a maximum sustainable yield in the region of 30,000 to 37,000 tonnes.

The second important commercial resource is the gastropod mollusc *Rapana thomassiana*, a non-native marine snail, now established in Bulgarian waters, where it feeds on the extensive beds of black mussels. This may be caught by diving or by dredging. Production in 1999 was 3,800 tonnes, although some catches are known to be unrecorded. The maximum sustainable yield is estimated to be about 8,000 tonnes per year. Whilst the level of production appears sustainable, there is considerable debate about the state of the resource and its inter-relation with the black mussel (*Mytilus galloprovincialis*), on which it preys. To protect mussel beds, the new Fisheries and Aquaculture Act 2001 prohibits its harvest by dredging. This measure will significantly reduce future *Rapana* catches.

The marine fisheries produce a wide range of other species, in variable and usually small quantities. Many species have seasonal patterns, depending on climatic and migratory features. For example, horse mackerel (*Trachurus trachurus*) was an important catch in the 1980s, but has now declined; good catches of bonito (*Sarda sarda*) were reported in 1999. Turbot (*Scophthalmus maeticus*) is a high value catch, which has been subject to unsustainable levels of exploitation in the past. Conservation action for this species, in the form of quotas and enforced closed seasons, has resulted in an apparent recovery of the stock.

2.1.2 Fishing fleet

All marine fisheries activity is now privatised, the process of disposal of state assets being completed in 1997. The fishing vessel register is still under development, and a rigorous basis for measurement of fleet capacity is not yet available. The best current estimate is provided in Table 4.

| | Length Metres | Number of vessels | % of vessels | Estimated Tonnage | % of capacity |
|------------------------|---------------|-------------------|--------------|-------------------|---------------|
| Burgas | < 8 | 3,010 | 76.5 | 7,525 | 21.5 |
| | 8-24 | 17 | 0.4 | 459 | 1.3 |
| | > 24 | 19 | 0.5 | 24,301 | 69.5 |
| Varna | < 8 | 862 | 21.9 | 1,461 | 4.2 |
| | 8-24 | 19 | 0.5 | 401 | 1.1 |
| | > 24 | 7 | 0.2 | 840 | 2.4 |
| Black Sea | < 8 | 3,872 | 98.4 | 8,986 | 25.7 |
| | 8-24 | 36 | 0.9 | 860 | 2.5 |
| | > 24 | 26 | 0.7 | 25,141 | 71.9 |
| Total Black Sea | | 3,934 | 100.0 | 34,987 | 100.0 |

Note that some vessels may not be used for fishing activities.

Source: NAFA fishing licence survey, 2000 and Ministry of Transport.

Table 4: Fishing fleet by length and size, 2000.

There were about 3,900 vessels registered in 2000, 98.4% of which are less than 8 metres in length. Total gross tonnage is 34,987GT. There are 36 vessels registered in the 8-24 metre class, and 26 vessels with length more than 24 metres. Vessels under 8 metres account for just 26% of capacity, and vessels over 24 metres account for 71%. The fleet appears to be highly polarised between small and large vessels. Most of the capacity is registered at the port of Burgas, although the operational port may be different.

| | Burgas | Varna | Total |
|--------------------------|--------|-------|-------|
| Open deck vessels | 814 | 609 | 1,423 |
| Closed <40GRT | 17 | 8 | 25 |
| Closed >40GRT | 12 | 4 | 16 |
| Totals | 843 | 621 | 1,464 |

Source: NAFA, 1999

Table 5: Fishing licences issued to fishing vessels in 1999

Fishing licence data in Table 5 suggests that in the Black Sea, 1,423 open deck boats were operating in 1999, and a further 41 closed vessels (16 of which are over 40GRT). It would appear that only about 37% of the registered vessels are operating at present. In particular 11 vessels over 8 metres, and 2,400 smaller registered vessels

were not active in licensed fishing. However, the number of licensed closed vessels in 2000 increased to 46, suggesting that only six were not operating.

Table 6 shows that in the year 2000, twenty-nine of the larger (closed) vessels were based in just three ports, Balcik, Nesebar and Sozopol.

| NUTSIII Region | NUTS IV Municipality | No.closed vessels | |
|-------------------|-------------------------|-------------------|-------|
| | | <40GT | >40GT |
| Dobrich | Balcik | 6 | |
| | Kavarna | 1 | |
| Varna | Varna | 3 | |
| | Bjala | 1 | |
| | Kamchiya | 1 | |
| | Frenkeman | 1 | |
| | Anton Ivanov | 2 | |
| | Zlaten rog | 1 | |
| Burgas | Pomoria | 2 | |
| | Nesebar | 6 | 5 |
| | Burgas | 2 | 2 |
| | Sozopol | 7 | 5 |
| | Carevo | 1 | |
| TOTAL | | 34 | 12 |

Source: NAFA fishing licence data, 2000

Table 6: Distribution of industrial vessels by NUTS IV region

2.1.3 Production

Production of marine species from the Black Sea in 1999 is shown in Table 5. Total production was 8,211 tonnes, worth just over €3 million at first sale. Production has been relatively constant, ranging between 7,500 and 9,500 tonnes over the last 5 years.

| | Burgas | | Varna | | Black Sea | |
|-----------------|--------|-----------|--------|-----------|-----------|-----------|
| | Tonnes | € | Tonnes | € | Tonnes | € |
| Sprat | 3.150 | 885.813 | 445 | 125.139 | 3.595 | 1.010.952 |
| Rapana | 1.550 | 396.251 | 2.250 | 575.203 | 3.800 | 971.455 |
| Gobies | 57 | 43.869 | 380 | 291.283 | 437 | 335.152 |
| Bluefish | 4 | 21.986 | 34 | 172.305 | 38 | 194.291 |
| Others | 129 | 250.993 | 211 | 285.966 | 341 | 536.959 |
| TOTAL | 4.891 | 1.598.912 | 3.320 | 1.449.896 | 8.211 | 3.048.808 |

Source: NAFA based on logbook declarations; values are estimates (based on field interviews with fishers and processing companies).

Table 7: Amount and value of marine fish landings by species, 1999

Sprat and *Rapana* dominate the landings, both in terms of weight of landed product and value. They account for 90% of landed weight and 65% of value (Figure 1). Gobies (*Gobiidae*) account for 11% and bluefish (*Pomatomus saltator*) 6% of value. A range of 12 other species account for 18% of landings value, the most important of which include turbot, bonito, horse mackerel and grey mullet.

The main fishing method for sprat is mid-water trawling, although smaller vessels also use ring-netting. Two fishing methods have been historically used for *Rapana*: diving, which is limited to depths below 20m, and dredging. Both use small-scale vessels.

No landing data are available at a disaggregated regional level other than that presented in Table 7, which approximates to NUTS III level. Burgas represents a NUTS III region covered by the NAFA office in that city, and includes seven municipal regions (NUTS IV) with marine fisheries activity. The Varna office represents two NUTS III regions (Dobrich with three coastal municipalities, and Varna with two coastal municipalities). It should be noted that NAFA is developing a system of landings and sales declarations, which in future will provide a basis for disaggregation of landings (both quantity and value) by port, and therefore at NUTS IV level.

2.1.4 Profitability of fishing enterprises

No data is available on the costs and profits of fisheries enterprises. More detailed study is required. However interviews with a significant number of fishers in coastal locations suggest that at best the activity is only marginally profitable, and were it not for lack of alternative employment many would leave the sector.

Most fishers operate from small vessels under 8m in length and many catch for their own consumption (subsistence fishing) and sell what they can locally. Larger vessels have higher levels of profitability, gaining from economies of scale but still suffer from lack of efficiency in operations (old vessels, inefficient engines and depressed prices due to lack of adequate marketing facilities). Some new investment in vessels is apparent, entirely funded out of revenues and is proceeding only at a slow pace.

2.2 Fish Processing

2.2.1 Dimensions and activities of the sector

There is no established routine survey of fish processing activities. As a result there is a lack of data on raw material sources and levels of inputs, production levels, costs structures and employment. However, some data has been gathered by personal interviews with selected establishments in some of the main sectors, but these are necessarily limited in extent and quality.

Forty-four fish processing establishments are registered with the National Veterinary Service. However many smaller establishments work only on a seasonal basis, or when raw materials are available at low prices. An unknown number are permanently

closed. Discussions with managers and owners in the fishery sector suggest that at present the number of permanently operating establishments is approximately seventeen (excluding three or four establishments which only re-pack imported frozen fish). Their main activities, locations, sources of raw materials and economic characteristics are shown in Table 8.

| Main activity | Source of Raw material | Region (NUTS III) | No. of Establishments | Employment 1999 | Value added €million |
|---------------------------------------|-------------------------------|--------------------------|------------------------------|------------------------|-----------------------------|
| Trout/ Marinades | Aquaculture/ Imports | Smolyan | 3 | 150 | 1.7 |
| Freezing/ reprocessing of marine fish | Black Sea/ Imports | Burgas | 2 | 120 | 1.5 |
| Reprocessing of marine fish | Imports | Haskovo | 1 | | |
| Canning | Black Sea/ Imports | Burgas | 1 | 160 | 1.0 |
| <i>Rapana</i> freezing | Black Sea | Burgas | 3 | 810 | 3.6 |
| | | Dobrich | 1 | | |
| | | Varna | 2 | | |
| Shrimp peeling | Imports | Blagoevrad | 1 | 990 | 2.0 |
| | | Smolyan | 1 | | |
| Caviar production | Danube | Plovdiv | 1 | 10 | n.a |
| Caviar production | Danube | Vidin | 1 | | |
| TOTALS | | | 17 | 2,230 | 9.8 |

Source - estimates based on trade interviews

Table 8: Numbers, locations and dimensions of fish processing establishments.

2.2.1.1 *Rapana* processing

The processing of *Rapana thomassiana* has become a significant activity. Six establishments are involved, one in Sozopol, two in Burgas, two in Varna, and one in Balcik. There may be between two and four clandestine enterprises also operating. Some of the companies have their own fishing boats. In addition they receive live *Rapana* directly from fishers. Raw material inputs to this process were 3,800 tonnes in 1999, value €70,000. Prices to fishers are reported to have doubled over the last decade. Some unrecorded landings may also occur, adding up to 2000 tonnes to the production.

The product is boiled and the meat removed by hand. Yields are approximately 17%. Meats are frozen for export to Japan and Korea. Sales revenue for 1999 is estimated at €4.5, and the value added (wages plus profits) is in the region of €3.6m. The cost structure of the sector indicates that it is a profitable business, as shown in Table 9.

| Cost items | Cost (€per tonne final product) |
|------------------------|-------------------------------------|
| Raw material | 3.6 |
| Processing and packing | 1.2 |
| Margin | 1.8 |
| Sales price | 6.6 |

Source: trade interviews

Table 9: Cost structure of *Rapana* processing

An estimated 810 people are employed in *Rapana* processing, 90% of them women. About two-thirds of those employed in this sector are part-time or casual workers, since the work is seasonal, corresponding to the *Rapana* fishing season (June to September). Several processors also undertake other forms of fish processing at other times of year (for examples freezing of sprat, or re-processing of imported raw material.)

The newly enacted Fisheries and Aquaculture Act 2001 is likely to have an impact on employment in this sector, since restricting *Rapana* fishing to diving will limit raw material supplies to processing. Trade sources suggest that supplies will fall by about 75% due to this restriction, suggesting that some 600 fish part-time processing jobs will be lost, mainly affecting women particularly in the municipalities of Balcik, and Sozopol, where there are negligible opportunities for alternative employment.

2.2.1.2 *Trout* processing

Trout processing is based in the Smolyan region. Three establishments are operating, and are part of the vertically integrated farming and processing operations. Estimated raw material inputs in 1999 were in the range of 1,200 tonnes per year (value €3.8 million). Approximately 150 people are employed. Final products are frozen trout, and frozen smoked trout fillets.

The loss of access to the European (and particularly German) market in 1999, due to weaknesses in the Bulgarian health control system for fishery products, has forced a reduction in production and a re-orientation to local and non-EU markets. Most of the producers now also undertake a re-processing of low value imported frozen fish (to produce smoked and marinated mackerel and herring) in order to survive until EU market access is re-established.

2.2.1.3 Fish canning

There is one cannery in Burgas which produces canned sprat, and also cans imported fish for local and regional markets. Capacity is 12,000 tonnes per year, but only about 15% is utilised. Raw material inputs in 2000 were 2,400 tonnes, of which 85% was imported mackerel, sardine and herring. Black Sea sprat and some farmed fish (carp) make up the balance). Estimated raw material purchases in 2000 were in the region of €1.3 million and sales revenue was about €5 million. The cannery employs some 160 staff (140 of who are women).

Added value is estimated to be in the region of €1 million (mainly in wages). The operation is only marginally profitable, and pursues a survival strategy relying on low cost of inputs to make up for the high overheads of the excess capacity. Future plans are to restructure the company as a smaller sized more efficient unit, with less emphasis on canned products.

2.2.1.4 Shrimp peeling

Two establishments are involved in shrimp peeling, a labour intensive processing in which Bulgarian labour rates (about €100/month plus social costs) provide a competitive advantage. The raw material is imported in frozen form, and comprises mainly of brown shrimp (*Crangon crangon*) from Holland and Belgium. Shrimp is boiled (if not already cooked), peeled by hand then packed in retail packs for chilled distribution to EU retailers. Volume of raw material is estimated at over 2,000 tonnes in 1999, with value added in excess of €2.0 million. The sector employed 700 workers in Yakoruda (Blagoevrad Region) and a further 290 in Devin (Smolyan Region).

The business ceased completely with the loss of access to the EU market in November 1999, following the results of the inspection by the Commission technical services. The EU partner (PAL Fisch GmbH) now arranges for shrimp to be processed in Belarus and Morocco. Although plans exist to launch a new investment when EU market access is re-established, it is not certain that the lost business can be recaptured.

2.2.1.5 Pelagic fish processing

About five or six establishments process marine pelagic fish in various forms (Table 10). Raw material is derived either from imports, or from Black Sea landings. These activities may be combined on a seasonal basis with other fish processing activities such as *Rapana* or trout processing.

| Species | Raw material source | Process | Markets |
|----------------|----------------------------|------------------------|-------------------|
| Sprat | Black Sea | Frozen/Salted/Marinade | Local/Regional |
| Mackerel | Norway | Marinated/Smoked | Local/Regional/EU |
| Anchovy | Turkey | Salted/Preserves | EU |
| Herring | Norway/EU | Marinade | Local/Regions |

Table 10: Pelagic fish processing; raw material and markets

Just one company in Burgas freezes about half of the sprat produced in Bulgaria; raw material input in 2000 was about 1,500 tonnes. In fact very little sprat is marketed in fresh form and most of the landings can be assumed to enter processing. The median raw material price into processing is in the region of €280/tonne (ranging between €100 and €400 depending on season and purchase volume). Selling prices (to wholesalers) for frozen sprat are in the region of €350 to €400/tonne. Sprat producers exporting to central European countries find that their product competes directly with Baltic sprat, which is priced some 20-30% cheaper due to lower production costs, mainly derived from greater volume of catches.

Other small pelagic products include marinades and salads. At present these products supply the wholesale trade within Bulgaria and neighbouring countries. However, demand is developing only slowly, and the range of product variations is great, increasing production costs.

No data is available on the volume and value of imported fish entering this processing sector, but total quantities are unlikely to exceed 2,000 tonnes (value €1 million).

2.2.1.6 Other activities

Two small establishments produce caviar from the limited catches (c.50 tonnes per year) of sturgeon in the Danube and the Black Sea. The establishments are located in Vidin and Plovdiv regions, and employ about total of about 10 staff.

2.2.2 Compliance with Council Directive 91/493/EEC

2.2.2.1 Competent Authority

The National Veterinary Service of the Ministry of Agriculture, Forestry and Agrarian Reform is nominated as the Competent Authority for the purposes of Directive 91/493/EEC on "health conditions for the production and placing on the market of fishery products for human consumption".

Commission technical services assess compliance with this Directive, which specifies hygiene conditions required in Member States and third country establishments. Only third countries, which can demonstrate an effective control system operated by the Competent Authority, are permitted to supply the Community. Thus compliance with the Directive is an important consideration for Bulgaria, not only as a matter of accession, but also for market access as a third country during the pre-accession period.

The NVS controls were assessed by a visit of Commission services to Bulgaria in October 1999. This mission found inadequate legislation, lack of laboratory capacities, incomplete residue monitoring for aquaculture products, inadequate veterinary control of establishments and lack of experience in the National Veterinary Service. As a result Bulgarian products were prevented from entering the Community market. Since that time the NVS has undertaken a substantial revision of the procedures, and a second inspection mission by the Commission was undertaken in July 2001. The results are awaited.

2.2.2.2 Industry compliance levels

Only approved establishments are permitted to supply the Community during the pre-accession period. At present there are four approved establishments (shown in Table 11), which will be permitted to supply the EU when access is re-established:

| Name | Activity | Location |
|-------------------------|------------------------|-----------------|
| Company Maxim Keranov | Caviar | Vidin |
| Company Perpen Chobanov | Caviar | Boljarci |
| Europesca | Fish filleting/Anchovy | Svilengrad |
| Rejafish | Trout | Dospa |

Table 11: Establishments complying with Council Directive 91/493/EEC

Several of the other establishments are known to be in the process of upgrading, but have not yet been granted approval by the NVS. Furthermore one or two major investment projects, with foreign joint venture partners, are known to be awaiting renewal of market access. This includes the re-establishment of shrimp peeling activity in the North Western part of Bulgaria. Clearly, renewal of, and maintaining European market access should be an important strategic objective for the Government of Bulgaria. During the pre-accession period 10 or 12 establishments may require investment in a new plant, or upgrading of existing facilities to meet EU regulatory standards.

One possible barrier to approval is the lack of technical skills for implementation of the Hazard Analysis and Critical Control Point system. This is a food safety management system required by the Directive 91/493/EEEC and also by the harmonised national legislation. Although some operators are aware of HACCP there are few technical resources available to support its development. FAO Eastfish supported a two week course in this subject in May 2001, but more work is required to train company staff and national consultants.

2.3 Aquaculture:

2.3.1 Overview of aquaculture sector

There is no regular data collected on aquaculture production in Bulgaria, and no farm surveys have been conducted. Estimates are derived from discussion with trade and institutional sources, but may be unreliable.

Production during the period 1995 to 2000 is shown in Table 12. Total output is estimated to be 8,200 tonnes, comprising about 1,200 tonnes of trout and 7,000 tonnes carp and other species. This latter figure is comparable to supplies from marine fisheries. In 2000, the total value of output at first sale is estimated at €12.8 million (Table 13), and the sector employs about 5000 people. Estimated gross value added is in the region of €2.5 million.

| Sector | | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|-------------------|-----------------------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Warm water | Private ponds | 1,600 | Na | 3,000 | 3,500 | 4,000 | 4,000 |
| | Cooperatives | 200 | Na | 600 | 1,000 | 1,000 | 1,000 |
| | Irrigation systems | 300 | Na | 600 | 1,000 | 1,000 | 1,000 |
| | Power station cooling ponds | 100 | Na | 300 | 400 | 700 | 1,000 |
| | Sub-total | 2,200 | Na | 4,500 | 5,900 | 6,700 | 7,000 |
| Trout | | na | | na | na | 980 | 1,200 |
| | TOTAL | 2,200 | - | 4,500 | 5,900 | 7,680 | 8,200 |

Table 12: Production of fish from aquaculture, 1995 to 2000

| Sector | Production (tonnes) | Unit Value €/tonne | Value (€) |
|------------------|----------------------------|---------------------------|-------------------|
| Carp and similar | 7,000 | 1,278 | 8,948,660 |
| Trout | 1,200 | 3,196 | 3,835,140 |
| Total | 8,200 | 1,559 | 12,783,800 |

Table 13: Aquaculture production volume and value in 2000

2.3.2 Rainbow Trout

2.3.2.1 Production

Rainbow trout production is concentrated mainly in the mountainous Smolyan region in the south of the country, where raceway production techniques are employed. Production has declined from a high of about 2,500 tonnes in the early 1990s, since the closure of a large cage production facility at Dospat. Production in year 2000 was estimated to be about 1,200 tonnes per year. About 180 people are employed in the sector.

The sector is highly stratified, with two enterprises (at Devin and Zlotna Panaga) accounting for about half of the production. Both are vertically integrated with processing and marketing activities. The balance is made up by about 20-25 small farms.

Production conditions are good, with winter temperatures in the range of 12-14°C, in summer up to 18°C. However output is limited by availability of water supply. In the last two years low rainfall has meant a reduction in production and an increase in costs due to the need to re-circulate and aerate water. Some of the smaller farms are located in lowland areas, where the growing season is limited by high summer temperatures. Due to lack of site availability, it is not considered that there will be any potential for increased production.

2.3.2.2 Production costs and margins

Eggs and juvenile fish are imported (from EU hatcheries in Denmark and Germany). Juveniles account for about 5-10% of the production costs. Formulated feed (which is also imported) accounts for 75-80% of production costs, and labour 15%. The breakdown is shown in Table 14. Total production cost is about €1.3/kg ex-farm (and about 15% higher for cage production system). Most of the high cost inputs are imported. Production costs are therefore not significantly lower than in export markets.

| Cost element | Cost lev/kg | Cost €/kg | % |
|----------------|-------------|-----------|-----|
| Juveniles/eggs | 0.26 | 0.13 | 10 |
| Feed | 1.95 | 1.00 | 75 |
| Labour | 0.39 | 0.20 | 15 |
| Total | 2.60 | 1.33 | 100 |

Table 14: Cost structure of trout farming, 2001

2.3.2.3 Marketing

The trout sector has developed mainly to meet export demand in Germany, in particular for a frozen smoked trout fillet. Here Bulgaria has a cost advantage in the labour required to undertake this process. Due to loss of access to this market, the producers now sell to other markets (Hungary and Czech Republic).

Domestic market demand is depressed due to lack of purchasing power. Frozen trout (gilled and gutted) is sold into this market at about €2.5/kg. There is no premium for fresh trout.

Providing that water supplies can be maintained, the sector is considered to have good prospects, especially once EU market access is re-established.

2.3.3 Carp

2.3.3.1 Production

Species produced in lowland waters include the common carp (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix*), big head (*Aristichthys nobilis*) and grass carp (*Ctenopharingodon idella*). Limited quantities of zander (*Stizostedion lucioperca*) and European catfish (*Silurus glanis*) are also produced. The main species are grass, bighead and common carp, accounting for about 70% of production. Grass, big head and silver carp tend not be differentiated strongly by the market.

Production of carp in 1982 was 14,800 tonnes. This fell to 2,550 tonnes in 1992. Since then all of the production capacity has been privatised (either by sale of farms, or leasing of water bodies to individuals). Production in 2000 was an estimated 7,000 tonnes, over half of which was from privately owned ponds. The output value at first sale was € million.

2.3.3.2 Production methods

Large farmers operate their own hatcheries, which also supply smaller farmers with fry. The Freshwater Fisheries Institute at Plovdiv (since 2001 part of the Fisheries Research Institute) is also a major supplier of juveniles. In 2000, the Institute supplied 1.2 million fingerlings and up to 20 million fry, accounting for 70% of all juveniles produced. Some of these were also used for restocking sports and capture fisheries.

The dominant production technology for grow out is semi-intensive polyculture located in lowland areas. Water bodies used for aquaculture include natural and artificial lakes, excavated ponds and power-station cooling ponds. Some units employ a more intensive cage mono-culture for common carp. Water temperatures are up to 30°C in summer, and in winter many ponds will freeze, limiting production.

Intensive producers use a pelleted feed, usually produced to order by local feed mills. However farmers complain of poor quality feed and at least one of the major operators is now importing compound feeds from Western Europe. Extensive producers (for example in lakes) may feed occasionally, but substantially rely on natural production.

2.3.3.3 *Industry structure*

There are an estimated 100 large farms (more than 50 tonnes per year) in this sector, and about 270 small ones (one or two person operations, with outputs less than 10 tonnes). The main locations are in the central regions of Plovdiv, Stara Zagora, Hoskovo and Yanboul, accounting for 80% of production. About 70 large farms are located in these regions. Of these Plovdiv is the most important. Other regions, in the Danube valley, account for the balance of production.

2.3.3.4 *Marketing*

A lack of organised marketing and integrated production, processing and marketing activities has meant many, especially smaller, producers have been unable to maintain profitability on domestic markets. The advantages of aquaculture over capture fisheries (in production planning and control of supplies) are lost to the sector.

In terms of export markets the sector has suffered from the loss of the Greek market for carp due the health control issue. Conflicts in Macedonia and former Yugoslavia, both historically important markets, has also had a negative impact on the sector.

2.3.3.5 *Production costs and margins*

Typical production costs for intensive carp culture are shown in Table 15. As with trout, feed is the major cost component. Extensive producers will save on feed costs, but sustain a higher level of fixed costs per unit (due to lower yields per hectare).

| Cost element | Cost lev/kg | Cost €/kg | % |
|-----------------------|--------------------|------------------|----------|
| Juveniles/eggs | 0.13 | 0.06 | 5 |
| Feed | 1.50 | 0.77 | 60 |
| Labour | 0.13 | 0.06 | 5 |
| Depreciation | 0.38 | 0.19 | 15 |
| Profit margin | 0.38 | 0.19 | 15 |
| Selling price | 2.50 | 1.28 | 100 |

Table 15: Cost structure of intensive carp farming

Many farmers experienced some difficulty maintaining prices at a profitable level and production is expected to be significantly less in 2001. There are recent reports of some farmers ceasing production.

2.3.3.6 *Potential for development*

The decline in production since 1982 suggests that only 50% of production capacity is utilised. However much of the unused capacity is likely to be uneconomic and/or defunct. Scope for increased production is limited by market demand. Existing distribution channels appear to be saturated, and many of the smaller and less efficient farmers have difficulty in obtaining prices that are adequate to cover the costs of production.

As a result, a number of farmers are actively diversifying into species new to Bulgarian aquaculture. These include sturgeon (*Acipenser* spp.) and the European crayfish (*Astacus astacus*). The expectation is that improved returns can be achieved by targeting higher value niche and export markets. However knowledge of the relevant hatchery and culture techniques is not widely disseminated. Credit facilities are not available on practical terms, and development is also limited by lack of capital and liquidity in existing operations.

2.3.4 Marine aquaculture

The Black Sea is considered to have some potential for development of line culture systems for the black mussel *Mytilus galloprovincialis*. Whilst this species is abundant in Bulgarian waters, quality and yield of wild harvested material is low, and below standards required to compete in export markets. A pilot project in Sozopol has established the technical feasibility of production. The promoters are seeking investment for full-scale production.

It should be noted that for any production to meet the health requirements for export to the EU, the National Veterinary Service must implement Council Directive 91/492/EEC "on health conditions for the production and placing on the market of bivalve molluscs for human consumption".

2.4 Danube fisheries

Bulgaria possesses an inland water area of 36,000 ha and 21,000 km of rivers. However inland fisheries in Bulgaria are dominated by the River Danube. Small-scale fisheries are distributed, relatively evenly, along its 470km length in Bulgaria. The resource is shared with Romania. Main centres of production are Ruse, Pleven and Vidin.

2.4.1 Fleet

An estimated 650 vessels pursue Danube fisheries. The vessels are small (up to 5 or 6 metres) open boats, powered by outboard motors (10-20hp). The mandatory minimum crew is two. Fishing trips are daily, and only rarely do vessels travel more than 2 or 3 km from their base. The main fishing methods used are small-scale drift nets. Speed of current (minimum 4 knots) excludes the use of fixed gears. About 10% of the licences are issued for hook and line gear.

2.4.2 Production

The principal species are barbel, carp (bighead, common and grass) and bream. European catfish and sturgeon are also caught. The production level is relatively constant, averaging about 1,000 tonnes per annum, as shown in Table 16.

| | Production (tonnes) | | | |
|---------------------|----------------------------|----------------|--------------|----------------|
| | 1995 | 1996 | 1997 | 1998 |
| Great sturgeon | 20.5 | 23.5 | 30.7 | 31.0 |
| Black sea sturgeon | 3.7 | 1.7 | 3.6 | 5.3 |
| Sterlet | 0.1 | 0.8 | 0.8 | 1.2 |
| Stor | 0.1 | 0.5 | 0.2 | 3.7 |
| Shad | 30.6 | 123.9 | 86.3 | 87.1 |
| Ruffe | 0.4 | 0.6 | 0.8 | 0.8 |
| Pike-perch | 22.3 | 25.8 | 15.0 | 15.2 |
| Eastern bream | 0.2 | 0.2 | 0.7 | 0.8 |
| Barbel | 92.0 | 119.6 | 112.3 | 113.3 |
| Orfe | 6.8 | 7.7 | 9.7 | 11.9 |
| Bleak | 2.4 | 5.9 | 7.0 | 11.4 |
| Danube bream | 73.6 | 90.6 | 90.2 | 82.0 |
| Asp | 3.2 | 3.9 | 4.8 | 6.9 |
| Undermouth | 1.5 | 1.0 | 3.4 | 2.8 |
| Catfish | 30.3 | 27.3 | 3.4 | 8.2 |
| Grass carp | 3.2 | 8.1 | 7.7 | 16.7 |
| Silver/bighead carp | 415.4 | 487.9 | 470.5 | 552.7 |
| Common carp | 18.7 | 16.3 | 16.0 | 19.9 |
| Pike perch | 0.1 | 0.1 | 1.5 | 15.8 |
| Others | 36.8 | 180.3 | 127.9 | 111.9 |
| Total fish | 761.9 | 1,125.7 | 992.5 | 1,098.6 |

Source NAFA

Table 16: Production of fresh water fish from the Danube River, 1995 to 1998

The catches are dominated by silver and bighead carp, accounting for 50% of production. Barbel and the euryhaline shad each account for 10% of catches. The balance of production is made up of a wide range of species. In terms of production value, the catches were worth an estimated 1.24 million leva (€0.63 million) at first sale (in 1998). The carp species account for 35% of the value, and shad 21%. Small volumes of high value sturgeon (which are processed for caviar) contribute about 10% of the catch value.

Since 1998 the MoAFAR and the Ministry of Environment and Water Resources have supported re-stocking of the Danube, with about 30,000 sturgeon fingerlings per year, plus 200,000 common and bighead carp. The main fishing season is September to May, with little availability of fish to catch during the summer months.

3 EMPLOYMENT AND FISHERIES DEPENDENCY

3.1 Overview of fisheries employment

The Bulgarian fisheries sector directly employs an estimated 12,260, of which 16% are women. The aquaculture sector represent the greatest source of employment, with nearly 5,000 persons employed, although this may be an over estimate. Nevertheless the sector is clearly an important source of employment in the rural parts of some

regions. Marine fisheries in the Black Sea accounts for 3,430 employed, with some municipalities being relatively highly dependent on this sector. Fish processing, which is the main source of female employment in the sector accounted for a further 2,230 jobs, although this number is not expected to be sustained due to plant closures in the shrimp and *Rapana* processing sectors. Inland fisheries accounts for a further 1,620 employed, mainly along the banks of the Danube River. Table 17 shows the employment summary.

| | Total | Men | Women |
|-------------------------|--------------|------------|--------------|
| Marine fishing | 3,430 | 3,430 | 0 |
| Aquaculture | 4,980 | 4,980 | 0 |
| Fish processing | 2,230 | 250 | 1,980 |
| Inland fisheries | 1,620 | 1,620 | 0 |
| Totals | 12,260 | 10,280 | 1,980 |

Table 17: Employment in fisheries activity, 1999/2000

3.2 Marine fisheries

3.2.1 Activities

Table 18 shows coastal fishing activity based on types of licences issued by NAFA in 2000. Of the 3,430 fishers issued licences for fishing in coastal regions in 2000, about two-thirds are individual fishers operating either alone, or as crew, in a two-man vessel. This illustrates the generally small-scale nature of this activity. Over 800 fishers are engaged in fishing on about 70 registered closed vessels, and this sector includes the industrial fishing vessels. About 350 persons are officially licensed for capture of molluscs (*Rapana*). However trade interviews indicate that many more people are involved in this activity, possibly to the extent of involving most fishers at certain times of the year. Fixed gears are operated by 129 fishers, and 44 work in coastal lagoons or freshwater lakes within coastal regions.

| | Burgas | Varna | TOTAL |
|--------------------|---------------|--------------|--------------|
| Industrial | 742 | 71 | 813 |
| Open boat | 57 | 14 | 71 |
| Fixed gear | 101 | 28 | 129 |
| Individual | 1,033 | 990 | 2,023 |
| Molluscs | 106 | 244 | 350 |
| Lagoon/Lake | 18 | 26 | 44 |
| Total | 2,057 | 1,373 | 3,430 |

Table 18: No. of coastal fishers by fleet segment, 2000

3.2.2 Locations of fishers

Table 19 shows locations of fishers by coastal municipal regions (NUTS IV).

Of the 3,430 licensed fishers, 395 are located in Dobrich, 978 in Varna region and 2,057 in Burgas region. Significant numbers of fishers (>100) are present in 12 municipalities, which contain the main Black fishing ports. These are:

- Balcik
- Kavarna
- Varna
- Bjala
- Rodona
- Pomoria
- Nesebar
- Burgas
- Sozopol
- Primorsko
- Carevo
- Ahtopol

| Region NUTS III | Municipality NUTS IV | Number |
|------------------------|-----------------------------|---------------|
| Dobrich | Balcik | 124 |
| | Kavarna | 150 |
| | Shabla | 81 |
| | Durankulak | 40 |
| | Subtotal | 395 |
| Varna | Varna | 232 |
| | Bjala | 168 |
| | Kamchiya | 48 |
| | Panorama | 24 |
| | Frenkeman | 33 |
| | Trakata | 42 |
| | Anton Ivanov | 59 |
| | Kazashko | 26 |
| | Rib.plag | 2 |
| | Buyata | 29 |
| | Chaika | 17 |
| | Rodona | 132 |
| | Zlaten rog | 6 |
| | Kranevo | 30 |
| | Almunal | 7 |
| | Krapec | 52 |
| | Rusalka | 8 |
| | Adabahcha | 14 |
| | Ezerovo | 4 |
| | Zvezdica | 4 |
| | Cherno more | 19 |
| | Sv. Maria | 8 |
| | Zlatni pyasaci | 1 |
| | Evksinovgrad | 0 |
| | Asparuhovo | 9 |
| | Shkorpilovci | 4 |
| | Subtotal | 978 |

| Region NUTS III | Municipality NUTS IV | Number |
|------------------------|-----------------------------|---------------|
| Burgas | Obzor | 1 |
| | Pomoria | 209 |
| | Nesebar | 229 |
| | Burgas | 677 |
| | Sozopol | 227 |
| | Primorsko | 109 |
| | Carevo | 151 |
| | Cernomorec | 54 |
| | Atiya | 8 |
| | Ahtopol | 157 |
| | Krastina | 1 |
| | Kameno | 2 |
| | Arkutino | 1 |
| | Kiten | 50 |
| | Rezovo | 18 |
| | Brazilovo | 0 |
| | Ravda | 27 |
| | Balgarovo | 0 |
| | Aitos | 5 |
| | Vlas | 20 |
| | Sokia | 24 |
| | Kraimotie | 14 |
| | Lozenec | 24 |
| | Banevo | 1 |
| | Varvara | 11 |
| | Sinomorec | 25 |
| | Slanchev bryag | 3 |
| | Rosenec | 1 |
| | Aheloi | 3 |
| | Banya | 1 |
| | Mirkovo | 0 |
| Plandin | 4 | |
| Shoumen | 0 | |
| Subtotal | | 2,057 |
| TOTAL | | 3,430 |

Table 19: No. of coastal fishers by region (NUTS IV)

3.2.3 Incomes and value added

Average revenue per fisher in 2000 is estimated at €90 each, suggesting that, after deduction of fishing expenses, net annual incomes might be in the region of €450 to €500. Although it is likely that catch value is underestimated, this income is comparable to incomes earned by fish processing workers (approximately €600 per year). It is not known whether fishers are able to make individual contributions to social security, but many fishers report that they do not.

3.3 Fish processing

3.3.1 Activities

Total number employed in fish processing is estimated to be 2,230 in 1999, in 17 establishments. A complete breakdown by establishment was shown in Table 8. Table 20 shows employment by activity in 1999 and 2001, with estimates for 2002.

| | Number of persons employed | | |
|---------------|----------------------------|-------|---------------------|
| | 1999 | 2001 | 2002 (estimated) |
| Trout | 148 | 148 | 148 |
| Marine | 322 | 322 | 322 |
| Rapana | 810 | 810 | 200 |
| Shrimp | 940 | 0 | 0 |
| Caviar | 10 | 10 | 10 |
| | 2,230 | 1,290 | 680 |

Table 20: Employment in fish processing by main activity

The most important sectors in 1999 were *Rapana* and shrimp processing, accounting for about 80% of processing employment. Loss of EU market access is estimated to have cost about 940 jobs in shrimp processing. Other sectors, which target the EU market, such as trout and caviar, were able to diversify markets and maintain their activities.

3.3.2 Gender and part-time work

Of the 2,230 employed in fish processing in 1999, approximately 84% were women. Approximately 700 of the jobs in fish processing (particularly those in *Rapana* processing) are seasonal, with the majority of these being women.

3.3.3 Locations of fish processing employment

Employment in fish processing is more widely dispersed than fishing employment, reflecting the significant levels of raw material derived from aquaculture and from imports, as shown in Table 21. Just under 400 were employed in Smolyan region in 1999 and 700 in the municipality of Yakoruda (Blagoevrad region). The majority of

these jobs have since been lost due to plant closures, and these are the two regions that have suffered most from the loss of EU market access.

In coastal regions, Burgos and Varna are important centres of employment with 595 and 388 jobs respectively, although many of them are seasonal.

| NUTS III | NUTS IV | Number of persons employed |
|-----------------|----------------|-----------------------------------|
| Smolyan | Devin | 288 |
| | Dospat | 80 |
| | Chipelara | 20 |
| Subtotal | | 388 |
| Varna | Varna | 330 |
| Subtotal | | 330 |
| Burgas | Burgas | 495 |
| | Sozopol | 100 |
| Subtotal | | 595 |
| Dobrich | Balcik | 100 |
| Blagoevrad | Yakoruda | 700 |
| Plovdiv | Boljarci | 5 |
| Vidin | Vidin | 5 |
| Haskovo | Svilengrad | 107 |
| TOTAL | | 2,230 |

Table 21: Employment in fish processing by NUTS IV region

3.3.4 Incomes and value added

The average wage in fish processing is reported to be in the region of €600 per year.

3.4 Fisheries dependency in coastal regions

Table 22 shows levels of dependency on fishing and fish processing in coastal regions at NUTS IV levels. The most fishing dependent municipalities are those of Primorsko (Burgas Region) with 16.6% of jobs in fishing, and Bjala in Varna region, with 11.9% of jobs in this activity. It should be noted that these are small municipalities with total employment of only 818 and 1,682 respectively. Burgas and Varna, with significant numbers of jobs in fishing (677 and 232 respectively) have lower levels of dependency (0.5 and 0.2% respectively). Here a more widely diversified economy will provide greater opportunities for alternative employment.

Generally fish processing dependency rates are lower than fishing, although this is not the case in Varna, where more jobs are due to fish processing. In the most dependent region, Sozopol, fish processing accounts for only about 1.4% of total employment. In Burgas (335 jobs) and Varna (320 jobs) fish processing accounts for about 0.2 to 0.3 of total employment.

| <i>NUTS III</i> | <i>NUTS IV</i> | <i>Population</i> | <i>Estimated Workforce %</i> | <i>Estimated Workforce Number of persons</i> | <i>Unemployment %</i> | <i>Estimated Unemployment Number of persons</i> | Number of persons employed | | Employment dependency ratios | | |
|-----------------|----------------|-------------------|------------------------------|--|-----------------------|---|-----------------------------------|-------------------|-------------------------------------|-------------------|----------------------|
| | | | | | | | <i>Fishing</i> | <i>Processing</i> | <i>Fishing</i> | <i>Processing</i> | <i>All fisheries</i> |
| Dobrich | Balcik | 22,311 | 41.2 | 9,192 | 20.5 | 7,308 | 125 | 40 | 1.7 | 0.5 | 2.3 |
| | Kavarna | 18,049 | 41.2 | 7,436 | 20.5 | 5,912 | 150 | 0 | 2.5 | 0.0 | 2.5 |
| | Shabla | 7,088 | 41.2 | 2,920 | 20.5 | 2,322 | 81 | 0 | 3.5 | 0.0 | 3.5 |
| | Durankulak | Na | | | | | 40 | | Na | | Na |
| Varna | Varna | 304,472 | 47.3 | 144,015 | 16.2 | 120,685 | 232 | 320 | 0.2 | 0.3 | 0.5 |
| | Bjala | 3,555 | 47.3 | 1,682 | 16.2 | 1,409 | 168 | | 11.9 | 0.0 | 11.9 |
| Burgas | Nesebar | 16,963 | 43.0 | 7,294 | 19.7 | 5,857 | 230 | | 3.9 | 0.0 | 3.9 |
| | | | | | | | | | | | 0.0 |
| | Pomoria | 27,598 | 43.0 | 11,867 | 19.7 | 9,529 | 209 | 0 | 2.2 | 0.0 | 2.2 |
| | Burgas | 435,704 | 43.0 | 187,353 | 19.7 | 150,444 | 677 | 335 | 0.5 | 0.2 | 0.7 |
| | Sozopol | 16,408 | 43.0 | 7,055 | 19.7 | 5,666 | 227 | 80 | 4.0 | 1.4 | 5.4 |
| | Primorsko | 1,902 | 43.0 | 818 | 19.7 | 657 | 109 | 0 | 16.6 | 0.0 | 16.6 |
| | Carevo | 11,903 | 43.0 | 5,118 | 19.7 | 4,110 | 151 | 0 | 3.7 | 0.0 | 3.7 |
| | Ahtopol | Na | 43.0 | | | | 157 | 0 | Na | Na | Na |
| | Rodona | Na | 43.0 | | | | 132 | 0 | Na | Na | Na |
| | Kiten | Na | 43.0 | | | | 50 | 0 | Na | Na | Na |
| | Krapec | Na | 43.0 | | | | 52 | 0 | Na | Na | Na |
| | | | | | | | 2,790 | | Na | | |
| | others | | | | | | 640 | | | | |
| | Total | | | | | | 3,430 | | | | |

Table 22: Fisheries dependency ratios in coastal NUTS IV regions

It should be noted that many jobs in fish processing (possibly up to two-thirds) are seasonal only, although there is no detailed basis for estimation of full-time equivalents.

It should be noted that in Bulgaria, fisheries dependency ratios are of the same order as those encountered within the EU. However the values are well below those encountered in the European Unions most fisheries dependent regions (typically 20% or 30% at NUTS IV in some parts of Greece, Spain and Portugal).

3.5 Inland fisheries

3.5.1 Employment

The River Danube fisheries employed 1,620 registered fishers in 2000. Up to and including June 2001, 1,320 licences were issued by the NAFA. The cost of the licence is 100 leva (€51). The number of fishers is reported to be relatively constant (with 1,733 licences reported for 1995).

| Year | Number of fishers |
|-------------|--------------------------|
| 1995 | 1,733 |
| 1996 | 1,916 |
| 1997 | 2,238 |
| 1998 | 1,871 |
| 1999 | Na |
| 2000 | 1,620 |

Table 23: Number of inland fishers, 1995 to 2000

Since the fishery is only marginally profitable, many fishers (estimated to be 60%) pursue fishing as an alternative source of income, with the main fishing activity at weekends. An estimated 30% of fishers are pensioners, and 30% have other employment (mainly in agriculture). Most fishers are male, with only 1% of licences issued to women. However women may accompany men on fishing trips, and be involved in gear preparation and/or marketing.

| Municipality | | Number of fishermen | |
|---------------|-----------|---------------------|-------|
| | | 2000 | 2001 |
| VIDIN | | | |
| 1 | VIDIN | 540 | 330 |
| 2 | MONTANA | | |
| 3 | KOZLODUI | | |
| 4 | ANTIMOVO | | |
| 5 | KOSHAVA | | |
| 6 | NOVO SELO | | |
| 7 | GRAMADA | | |
| 8 | DIMOVO | | |
| 9 | DUNAVCI | | |
| PLEVEN | | | |
| 1 | BELENE | 240 | 210 |
| 2 | NIKOPOL | | |
| 3 | SOMOVIT | | |
| 4 | ZAGRAGDEN | | |
| 5 | BAIKAL | | |
| 6 | ORYAHOVO | | |
| RUSE | | | |
| 1 | SILISTRA | 840 | 700 |
| 2 | TUTRAKAN | | |
| 3 | RUSSE | | |
| 4 | RYAHOVO | | |
| 5 | PIRGOVO | | |
| 6 | SVISHTOV | | |
| TOTALS | | 1,620 | 1,340 |

Table 24: Number of Danube fishers by NUTS III region (2000 and 2001 to June)

3.5.2 Numbers of fishers at municipal level

No data is available to disaggregate numbers of fishers at NUTS IV (municipal) level. However, it is possible to estimate this, based on the assumption that catches are distributed evenly along the length of the River Danube. The resulting estimated distribution is shown in Table 25 below (based on an estimated 2000 catch of 850 tonnes).

| NUTS IV | Catch (tonnes) | Value (leva) | Value (€) | Number of fishers |
|----------------|----------------|--------------|-----------|-------------------|
| Vidin | 117 | 131,833 | 67,413 | 222 |
| Montana | 17 | 18,833 | 9,630 | 32 |
| Vraca | 33 | 37,667 | 19,261 | 64 |
| Pleven | 83 | 94,167 | 48,152 | 159 |
| Veliko Tarnovo | 100 | 113,000 | 57,782 | 191 |
| Rousse | 300 | 339,000 | 173,348 | 572 |
| Silistra | 200 | 226,000 | 115,565 | 381 |
| TOTAL | 850 | 960,500 | 491,153 | 1,620 |

Table 25: Estimated nos. of Danube fishers by NUTS IV region

3.5.3 Incomes and value added

Gross revenue at first sale in 1998 was about 1.24 million leva (€0.63 million), equivalent to an average of 665 leva (€340) per fisher. It is estimated that, about half the income is to be spent on fuel and gear. Net value added is in the region of 0.6 million leva (€07,000).

3.6 Aquaculture

According to the Freshwater Fisheries research Institute an estimated 4,980 people are employed in aquaculture, with 180 working in trout and 4,800 in culture of carp, as shown in Table 26. This latter figure would seem to be an over-estimate, suggesting that some 100 of the larger production units employed an average of about 40 staff each. Employment in trout farming is concentrated mainly in the Smolyan region in the south of Bulgaria. Carp culture is widespread in lowland regions, with just four regions of Plovdiv, Stara Zagora, Haskovo and Yambol accounting for 70% of employment.

| Sector | NUTS III | NUTS IV | Number of Units | Number of persons employed | |
|--------|-----------------|-----------------|-----------------|----------------------------|--------------|
| Trout | Smolyan | | 8 | 40 | |
| | | Devin | 1 | 25 | |
| | | Lovech | 1 | 15 | |
| | | | 10 | 50 | |
| | | Samokov | 10 | 50 | |
| | Subtotal | | 30 | 180 | |
| Carp | Plovdiv | | 20 | 960 | |
| | Stara Zagora | | 20 | 960 | |
| | Haskovo | | 10 | 480 | |
| | Yambol | | 20 | 960 | |
| | Others | | 30 | 1,440 | |
| | | Subtotal | | 100 | 4,800 |
| | | TOTALS | | | 4,980 |

Table 26: Estimated employment in aquaculture by NUTS III Region and type of aquaculture

4 MARKETING

4.1 Supplies to market and consumption

Supplies of fish available for human consumption are shown in Table 27. Apparent consumption was around 20,000 tonnes in 1997 and 1999. Consumption appeared to be much higher in 1998 (33,000 tonnes), due to high level of imports recorded for that year. This may be an anomalous result, but it is not possible to check without reference to disaggregated trade data, which is presently unavailable.

| | 1997 | 1998 | 1999 |
|-------------------------------|-------------------|--------|--------|
| | Tonnes | | |
| Black Sea | 9,423 | 8,514 | 8,211 |
| Danube | 1,042 | 1,098 | 859 |
| Aquaculture | 4,500 | 5,900 | 7,680 |
| TOTAL | 14,965 | 15,512 | 16,750 |
| Imports | 16,468 | 21,249 | 7,912 |
| Less exports | 11,028 | 3,804 | 3,745 |
| Apparent consumption | 20,405 | 32,957 | 20,917 |
| | | | |
| | Kilogrames | | |
| Per capita consumption | 2.48 | 4.00 | 2.54 |

Table 27: Production, trade and supplies of fish for human consumption, 1998 to 2000

Using 1997 and 1999 as the indicator years, apparent consumption was about 2.5 kg/capita. It should be noted that for the same years (1997 and 1999) the National Statistical Institute estimated the per capita fish consumption to be 2.2 and 3.1 kg respectively. The same source (based on household consumption surveys) suggests that consumption has varied between 1.7kg and 4kg per capita over the last 10 years.

Per capita fish consumption in Bulgaria is approximately one sixth of the global average, and on tenth of the EU average. Fish does not play an important role in the Bulgaria diet.

4.2 Prices and price trends

4.2.1 Marine fish prices at first sale

No information is available, on the trends over time, in the prices at first sale of marine fish. The introduction of a system of landing and sales notes by NAFA will ensure availability of time series data in the future. Fishers and processors report that prices have not changed significantly over the last two years, except for typical seasonal fluctuations.

Current average prices (March 2001) are indicated in Table 28.

| | Price/tonne | |
|------------------|-------------|-------|
| | Leva | € |
| Sprat | 550 | 281 |
| Horse mackerel | 4,000 | 2,046 |
| Bonito | 3,500 | 1,790 |
| Turbot | 5,000 | 2,558 |
| Anchovy | 1,000 | 512 |
| Gobies | 1,500 | 767 |
| Dog fish | 5,000 | 2,558 |
| Grey mullet | 3,000 | 1,535 |
| Blue fish | 10,000 | 5,115 |
| Little mullet | 2,000 | 1,023 |
| Garfish | 7,000 | 3,581 |
| Atherina | 4,500 | 2,302 |
| Shad | 4,500 | 2,302 |
| Great sturgeon | 9,000 | 4,604 |
| Russian sturgeon | 9,000 | 4,604 |
| Rapana | 500 | 256 |
| Mussels | 500 | 256 |
| Shrimps | 5,000 | 2,558 |

Source: interviews with fishers and processors in Burgas and Varna

Table 28: Ex-vessel prices of selected fishery products, March 2001

4.2.2 Freshwater fish prices at first sale

Apart from shad, catfish and sturgeon (which account for about 8%, 1% and 4% of catches respectively) prices at first sale are in the region of 1 leva/kg or less. Fishers complain of difficulty in meeting the costs of fuel and gear repair/replacement. The activity is only marginally remunerative and is widely regarded as suitable only for providing a supplementary income. It is however important for an estimated core of 600-700 full-time fishers who rely exclusively on the Danube fishery.

Typical first sale prices in 2001 were as follows.

| Species | Price at first sale (leva/kg) | Price at first sale (€/kg) |
|------------------|-------------------------------|----------------------------|
| Barbel | 1.00 | 0.51 |
| Common carp | 1.6 | 0.82 |
| Bighead carp | 0.8 | 0.41 |
| Silver carp | 0.80 | 0.41 |
| European catfish | 3.00 | 1.53 |
| Sturgeon | 3.50 | 1.79 |
| Bream | 0.80 | 0.41 |
| Pike/perch | 1.00 | 0.51 |
| Shad | 3.00 | 1.53 |

Sources; interviews with fishers

Table 29: Prices at first sale of Danube fish, 2001

4.2.2.1 Consumer prices

Data, on average prices of fresh fish on the retail market, is collected on a routine basis by the National Statistical Institute. Although hyperinflation in the 1990s has made price changes difficult to track, it is relevant to compare changes in fish prices to the consumer relative to the price of other foods. This is shown for the years 1989 and 1999 in Table 30.

| Retail prices 1989=100 | | |
|-------------------------------|-------------|-------------|
| | 1989 | 1999 |
| Beef | 100 | 66.355 |
| Pork | 100 | 85.199 |
| Chicken | 100 | 89.474 |
| Fresh Fish | 100 | 176.642 |

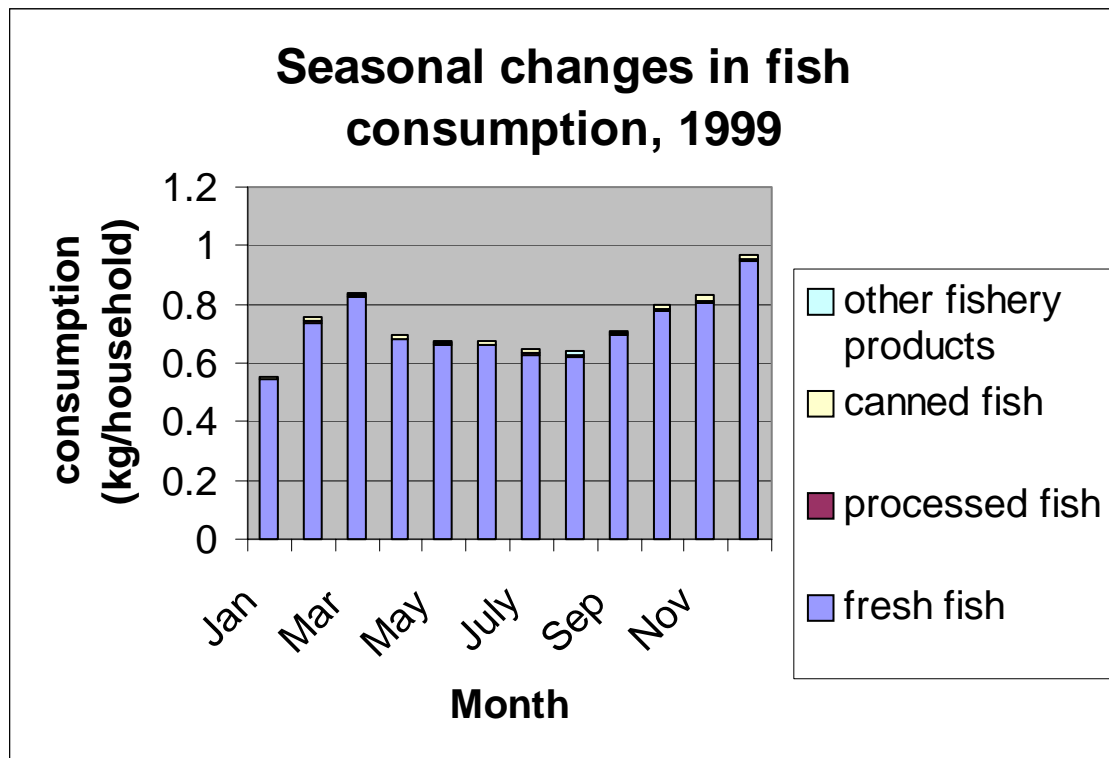
Source: National Statistical Institute

Table 30: Retail price changes for fish and other foods, 1989 to 1999

Fish prices at retail level have consistently risen faster than other foods. Relative to 1989, fresh fish is now nearly three times more expensive than beef, and twice as expensive as chicken and pork.

4.3 Seasonality in supply and demand

Seasonal patterns in fish consumption are evident, as shown by Figure 1. Demand, and consumption, is highest in month of December (corresponding with the consumption of fish, particularly carp, as a traditional festival dish on 6th. and 19th.December) and lowest in January. Monthly household consumption can vary by a factor of 1.75 between these months. July and August are also months when fish consumption is reduced.



Source National Statistical Institute

Figure 1: Seasonal variations in demand for fishery products

There is limited marine fishing during the summer season, which is regarded as the traditional time for a vessel overhaul. Interviews with fishers suggest that some species of fish could be caught during this season (such as sprat) but high temperatures cause difficulty in conserving the catch. As a result, supplies to market from this source are reduced during the months of July and August.

4.4 Marketing channels

4.4.1 Marine fish

The fish marketing system for marine fish is not organised, and has no concentration of supply at any stage. In the coastal cities of Burgas and Varna, fish landings are not centralised, with fish landed at several privately owned locations. In the case of sprat, the majority of landings are transferred directly to processing, where the product is frozen. Other fish species are sold directly to restaurants or are traded via a small number of wholesalers.

Outside the coastal cities, fish is landed at numerous locations. Some ports have good harbours (e.g. Nesebar, Kavarnik, Balcik). However there are no organised times or places for markets of first sale, and fishers are individually responsible for marketing their catch, either locally or to 5 or 6 wholesalers in Burgas and Varna. Wholesalers will sell sprat and limited quantities of other species to processors, and will also sell directly to restaurants and market retailers, and to inland wholesalers.

Inland, marine fish supplies are traded by wholesalers, many of whom also trade in other food products. These receive fresh fish from coastal wholesalers, frozen sprat from processors and frozen imported fish from importers, and supply the inland retail markets and shops. The volumes of fresh fish are small (perhaps less than 20% of total catches) and supplies sporadic. Little fresh marine fish is therefore available for sale to inland consumers.

4.4.2 Aquaculture products

In the case of carp and other products of warm-water culture production is widely dispersed. Many small producers find local markets, with direct supply to restaurants and retailers. Medium sized and larger producers need to distribute product to centres of population, and in such cases supply wholesalers (who may also have retail outlets) or if volumes are sufficient, directly to retail shops or market stall-holders.

Consumers pay premium prices for live carp (3.2 leva/kg compared to about 2.0 leva/kg dead). Live transport and holding facilities are used by larger enterprises throughout the distribution chain, including at retail level, but these facilities are not always available to products from smaller producers.

The main demand for common carp is in December, when up to 40% of annual sales can be made. However, smaller farmers in remoter locations (when access may be difficult due to the weather conditions), and who may not have access to transport find difficulty in achieving adequate prices for their products, even at this time of year.

The trout sector is mainly directed at export markets (although temporarily the main export market, the EU, is not available). Only about 250 tonnes out of an annual production of 1,200 tonnes is sold in Bulgaria. Vertically integrated farming and packing operations will supply fresh fish directly to retailers and restaurants in population centres (about 35% of sales) and frozen and smoked fish via wholesalers (65%).

4.4.3 Freshwater capture fisheries

The production is widely dispersed and the volumes relatively low. Most of the production is marketed directly as fish in fresh form to catering or retail outlets. Only the sturgeon enters processing. Marketing chains tend to be short with most of the low value species consumed in the region where they are caught. Only higher value species are distributed to other centres. There are an estimated 15 to 20 traders involved in distribution and re-selling.

4.5 Prices and margins in distribution

In Table 31 prices and margins in the distribution chain are shown for the main species from marine fisheries (sprat) and aquaculture (common carp).

| | Gross revenue/kg | | | |
|------------------------|-------------------------|----------|-------------|----------|
| | Sprat | | Carp | |
| | Leva | € | Leva | € |
| Fisher/producer | 0.4 | 0.20 | 2.50 | 1.28 |
| Processor | 0.25 | 0.13 | | |
| Wholesaler | 0.15 | 0.08 | | |
| Retailer | 0.6 | 0.31 | 1.40 | 0.72 |
| Selling price | 1.4 | 0.72 | 3.90 | 1.99 |

(Revenues are shown before deduction of costs)

Table 31: Median prices and margins in the distribution of fish from marine fisheries and aquaculture

4.5.1 Marine fish

In the case of sprat, the fisher receives 28% of the selling price to consumers, the processor 18%, wholesaler 11% and the retailer 43%. Wholesale and retail margins do not appear to be excessive (with mark-ups of 23% and 75% on buying-in prices) and are broadly in line with EU margins. Wholesalers, retailers and consumers appear to be price sensitive and are aware of the prices charged by the competition. Prices fluctuate according to the supply situation, and changes in demand, with clear evidence of seasonal effects.

The main inefficiency in the market is due to the cost of freezing. Apart from some seasonal periods, this is an unnecessary processing stage for the domestic market, since the product is subsequently thawed for retail display. It would be more efficient to distribute the fish in fresh form.

The extent of the inefficiency may be under-represented in Table 31 (which shows seasonal median prices) since larger processors buy in volume when prices are low, so the fisher often receives only 0.25 leva/kg (€0.13/kg) for significant parts of the annual catch.

The price of sprat (range 0.25 to 0.8leva/kg, median 0.4, about €0.2) is reported to be too low to justify the use of ice at sea. However, the inefficient distribution caused by the additional costs of freezing gives some scope for increased margins for fishers. If fresh fish were distributed via organised transparent markets, the fishers could be expected to receive the costs presently spent in freezing, increasing the price received by an estimated 60%. This might give some scope for use of ice, thus extending the potential for distribution to more distant markets.

4.5.2 Fish from aquaculture and freshwater fisheries

In the case of freshwater fish, the effect of the much shorter distribution chain is immediately apparent. Larger farms selling to larger retailers provide economies of scale and reduced costs to intermediaries. Where product is supplied through wholesalers to smaller retailers, both will carry lower margins, as will smaller farmers who supply through wholesalers. There is however evidence that the poor

concentration of supply in some regions and sectors can cause problems of sustainability. Some small farmers report that they can only obtain prices of 1.2 leva/kg (€0.61/kg) at certain times of the year (for example during the winter).

4.6 Grading by size and quality

4.6.1 Marine fish

Black Sea sprat is caught at a smaller size to Baltic sprat and better meets the requirements of some markets e.g. for marinated products, where the smaller bones are completely dissolved by the acid during processing. However grading is not necessary since catches are homogeneous.

The processor may grade *Rapana*, for the purposes of determining prices to the fisher. Grading is by hand. Otherwise there is no grading marine fishery products by size or quality prior to marketing.

4.6.2 Aquaculture products

The market is price sensitive to the size of fish from aquaculture. In particular carp below about 1.5 kg in weight are difficult to sell, and on-farm grading at harvest is the common practice.

4.7 Marketing Infrastructure for fresh fish

4.7.1 Landing sites and facilities and capacities

The lack of concentration of supplies of marine fish is a function of the non-existence of any significant infrastructure for fish landings and markets of first sale. Fish landings are therefore widely dispersed, and traders, should they wish to buy fish, have difficulty in locating supplies at a regular place and time. This feature is the main barrier to increasing the distribution of fresh fish to inland markets, based on an increased exploitation of the sprat resource.

Generally, ice is required to:

- extend the duration of fishing trips
- ensure that perishable fish such as sprat and horse mackerel can be landed in good condition during the summer months (subject to the price justifying the cost)
- enable inland traders to distribute their purchases throughout the country.

One or two of the larger fish freezing companies recognise this need and have installed ice plants, and supply ice to fishers. However most fishers do not have convenient access to ice supplies at reasonable cost. The lack of ice supplies (and associated fish handling facilities such as boxes, box washing, weighing and temporary chilled storage) at the fishing ports is a further factor which inhibits the development and full exploitation of marine fisheries.

4.7.2 Coastal markets for first sale of fish

Sales from fishers to processors or wholesalers are contracted by private negotiation. There are no specific locations or times when traders from outside of the region can buy fish. Lack of transparency is a barrier to entry to fish trading by small scale traders, who might otherwise buy fresh fish at coastal ports and transport it to inland markets. The prices to fishers are therefore maintained at low and only marginally profitable levels.

4.7.3 Inland markets for fish

Inland, there are no wholesale markets for fresh fish from any source. Inland traders who wish to buy fresh fish (for example for retail or catering trades) are compelled to deal directly with coastal fishers or coastal wholesalers in the case of marine fish, and directly with farmers or individual wholesalers in the case of aquaculture products.

4.8 Marketing Infrastructure for frozen fish

Frozen fish supplies are derived from freezing of sprat by coastal processors and from imports. In general there appear to be sufficient freezing facilities for the existing level of catches, including seasonal peaks. However freezing is usually by blast freezing, whilst brine or vertical plate freezing may be more appropriate for bulk freezing of small pelagic fish such as sprat. Some new investment in freezing capacity is planned by processors in both Burgas and Varna.

Cold storage facilities are widely available, both in fish processing establishments, and establishments owned by frozen food importers (including fish importers and distributors). Three or four frozen fish distributors are operating, and each has a national network of cold storage sites in major cities. The market appears to function well in the distribution of frozen fish, with an adequate provision of private infrastructure in relation to market demand.

5 INTERNATIONAL TRADE

5.1 Data availability and quality

Statistical data on trade in fishery products is incomplete. For fresh and frozen products, the National Statistical Institute can only supply trade data in aggregated form, to two figures of the Harmonised System (Code 03, covering all species of fish, molluscs and crustacea). Furthermore, to retain confidentiality, data for imports of fish under Code 03 in 1996 is not available, neither is data for exports of canned fish (1605) and fishmeal (230120) in 1999. As a result of these data limitations, only a crude analysis of the trade situation is possible. In addition, some apparent data anomalies (e.g. abnormally high imports in 1999) cannot be resolved.

5.2 Imports

Imports of fish (including fishmeal) from 1995 to 2000 are shown in Table 32. Import levels have varied significantly (from €3.5 to €26 million depending on the national economic situation).

| HS Code | | 1995 | | 1996 | | 1997 | | 1998 | | 1999 | | 2000 | |
|---------|----------------------------|------------|------------|-----------|-----------|------------|------------|------------|------------|------------|------------|-----------|------------|
| | | Kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ |
| 03 | Fresh and frozen fish | 2,810,300 | 6,254,000 | na | na | 16,385,342 | 12,938,316 | 20,923,861 | 19,143,859 | 7,428,910 | 11,146,627 | 1,641,607 | 9,133,580 |
| 1604 | Canned fish | 407,488 | 572,000 | 204,336 | 199,523 | 79,985 | 104,872 | 316,612 | 3,303,300 | 475,974 | 538,667 | 438,831 | 762,032 |
| 1605 | Canned mollusc/crustacea | 20,516 | 1,867,000 | 21,095 | 48,213 | 2,400 | 8,227 | 8,978 | 28,534 | 7,012 | 12,689 | 20,930 | 37,972 |
| | fish for human consumption | 3,238,304 | 8,693,000 | 225,431 | 247,736 | 16,467,727 | 13,051,415 | 21,249,451 | 22,475,693 | 7,911,896 | 11,697,983 | 2,101,368 | 9,933,584 |
| 2310120 | Fishmeal | 8,976,472 | 3,997,000 | 5,627,392 | 3,269,714 | 5,187,099 | 2,934,128 | 5,392,359 | 3,189,225 | 3,422,317 | 1,612,874 | 3,604,084 | 1,571,271 |
| | TOTAL | 12,214,776 | 12,690,000 | 5,852,823 | 3,517,450 | 21,654,826 | 15,985,543 | 26,641,810 | 25,664,918 | 11,334,213 | 13,310,857 | 5,705,452 | 11,504,855 |

Table 32: Quantity and value of imports of fishery products into Bulgaria, 1995 to 2000

| HS Code | | 1995 | | 1996 | | 1997 | | 1998 | | 1999 | | 2000 | |
|---------|----------------------------|------------|------------|------------|------------|------------|------------|-----------|------------|-----------|-----------|-----------|-----------|
| | | Kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ | kg | US\$ |
| 03 | Fresh and frozen fish | 9,608,050 | 14,728,000 | 24,386,066 | 27,679,433 | 10,959,048 | 12,075,455 | 3,722,730 | 7,414,268 | 3,389,214 | 6,964,537 | 4,706,455 | 8,358,060 |
| 1604 | Canned fish | 68,585 | 14,873,000 | 321,490 | 832,439 | 50,916 | 606,157 | 55,372 | 4,490,530 | 355,395 | 979,489 | 1,740,122 | 526,618 |
| 1605 | Canned mollusc/crustacea | 2,008 | 16,000 | 6,172 | 62,205 | 18,066 | 114,075 | 25,938 | 141,396 | na | na | 113 | 326 |
| | fish for human consumption | 9,678,643 | 29,617,000 | 24,713,728 | 28,574,077 | 11,028,030 | 12,795,687 | 3,804,040 | 12,046,194 | 3,744,609 | 7,944,026 | 6,446,690 | 8,885,004 |
| 2310120 | fishmeal | 1,861,755 | 1,037,000 | 589,718 | 3,951,569 | 1,469,145 | 966,217 | 113,165 | 75,387 | na | na | na | na |
| | TOTAL | 11,540,398 | 30,654,000 | 25,303,446 | 32,525,646 | 12,497,175 | 13,761,904 | 3,917,205 | 12,121,581 | 3,744,609 | 7,944,026 | 6,446,690 | 8,885,004 |

Table 33: Quantity and value of exports of fishery products from Bulgaria, 1995 to 2000

5.2.1 Fish for human consumption

In 1999, total fish imports were 11,330 tonnes, of which 7,900 tonnes was for human consumption. The value of these imports was US\$11.1 million, of which about US\$3 million is assumed to be in the form of shrimp for re-export, and US\$8 million in the form of frozen fish, either for direct sale or for re-processing. The main sources of supply were Mauritania (44%), UK, Norway and the Russian Federation. The species are not known, but certainly include significant quantities of small pelagic fish such as sardine, mackerel and herring. The breakdown is shown in Table 34. In addition Bulgaria imported 470 tonnes of canned fishery products, at a value of US\$800,000.

| | Imports 1000 US\$ | |
|--|-------------------|--------|
| | 1998 | 1999 |
| Total of live, fresh and frozen fish and fishery products | 19,144 | 11,149 |
| Included frozen fish (exc.fillets) | 11,880 | 8,198 |
| Mainly imported from : | | |
| <i>Mauritania</i> | 4,483 | 3,567 |
| <i>UK</i> | 2,080 | 1,666 |
| <i>Norway</i> | 3,617 | 1,450 |
| <i>Russian Federation</i> | 420 | 839 |

Table 34: Sources and value of imported fishery products, 1998 and 1999

5.2.2 Fishmeal

During the period 1995 to 2000, annual imports of fishmeal by Bulgaria were in the range of 3,000 to 9,000 tonnes. In 2000 imports were 3,600 tonnes worth US\$1.6 million. The main sources are South America and Turkey.

5.3 Exports

In 2000 Bulgaria exported 6,450 tonnes of fishery products for human consumption, at a value of US\$8.9 million. The level of exports has declined significantly since the mid-1990s, from a level of over 25,000 tonnes in 1996, as shown in Table 33. This decline is likely to be associated with the cessation of the distant water fishing operations, and since 1999, due to loss of the EU market access.

About 73% of the export volume, and 94% of the value is in the form of frozen fishery products, which will include *Rapana* to SE Asia and (prior to 2000) peeled shrimp to the EU. The balance of exports is comprised of canned fish, which has shown a significant increase in exports in 2000 compared to previous years, to a level of 1,740 tonnes (value US\$530,000).

Unfortunately there is no data to allow an estimation of the precise export revenues due to the *Rapana* sales to the SE Asia, and the amounts due to peeled shrimp to the EU. Thus the obvious potential impact of recent events on export revenues (namely the loss of EU market access and new restrictions on *Rapana* fishing) cannot be assessed with any accuracy. However it is certain that a significant part of the US\$7 million of exports for human consumption in 1999 was due to these two products.

5.4 Tariff regime for international trade

5.4.1 Duties on imported fishery products

Table 35 below provides a summary of the present levels of duty on imported fishery products.

| HS Classification | Description | Import duty (%) | | | |
|-------------------|---|-----------------|---------|----|------|
| | | General | Special | EU | EFTA |
| 03 | Live, fresh, frozen fish, crustacean and molluscs, except those below | 10 | 7 | 10 | 0 |
| 0303 10 00 | Frozen Pacific salmon | 5 | 3 | | 0 |
| 0303 22 00 | Frozen Atlantic salmon | 5 | 3 | 5 | 0 |
| 0303 50 00 | Frozen herring | 5 | 3 | 5 | 0 |
| 0303 74 30 | Frozen mackerel | 5 | 3 | 5 | 0 |
| 0307 31 10 | Live, fresh or chilled mussels | 20 | 15 | | 0 |
| 1604 | Preserved fish and caviar, except those below: | 25 | | | 0 |
| | Canned tuna in oil | 25 | 20 | 25 | 0 |
| 2301 20 | Fishmeal | 0 | | | 0 |

Table 35: General and special duty rates for imported fishery products

General duty rates apply to all countries except those where there is a special duty. Special duty rates apply to a number of countries and regions, which are subject to bilateral trade agreements. EU and EFTA rates are subject to special agreements.

5.4.2 Trade with the EU

In the case of fish imported from the EU, duty rates are 10% except for frozen fish entering processing, which carries a reduced rate of 5%. The EU-Bulgaria Association agreement (not yet ratified) foresees a broad bilateral reduction of tariffs on agricultural products. About two thirds of commodities are zero rated (both ways), but this does not include fishery products, where duty free tariff quotas will apply (see Tables 36 and 37). Volumes in excess of these quotas will be charged duty according to the standard rates above.

| Tariff code | Description | Duty | Annual quantity (tonnes) |
|--------------------|---|-------------|---------------------------------|
| 030321 | Frozen trout | Free | 50 |
| 030350 | Frozen herring | Free | 500 |
| 030371 | Sardines, brisling or sprat | Free | 200 |
| 030374 | Frozen mackerel | Free | 3,500 |
| 030379 | Other frozen fish | Free | 500 |
| Ex 03041038 | Fillets of herring and mackerel | Free | 100 |
| 030420 | Fillets other than mackerel and herring | Free | 100 |
| 030490 | Other fish meat | Free | 200 |
| 030530 | Fillets dried salted or in brine but not smoked | Free | 75 |
| 030541 | Smoked salmon, Atlantic , Pacific and Danube | Free | 100 |
| 030569 | Other salted fish not dried or smoked and fish in brine | Free | 250 |
| 03061330 | Shrimps and prawns frozen | Free | 1,000 |
| 03062331 | Shrimps and prawns frozen | Free | |
| 03062339 | Shrimps and prawns frozen | Free | |
| 030749 | Other molluscs | Free | 200 |
| 160413 | Sardines, sardinella | Free | 120 |
| 160414 | Tunas, skipjack and bonito | Free | 200 |
| 160415 | Mackerel | Free | 180 |
| 160420 | Other prepared and preserved fish | Free | 150 |

Table 36: EU/Bulgaria Association Agreement - Imports into Bulgaria from the European Community subject to concessionary rates

| Tariff code | Description | Duty | Annual quantity (tonnes) |
|-------------|--|------|--|
| 03019300 | Carp live | Free | 200 |
| 03026911 | Carp, fresh, chilled | Free | 50 |
| 03032100 | Trout frozen | Free | 260 |
| 03041019 | Fresh or chilled fillets of freshwater fish other than trout or salmon | Free | 150 (of which max 20 of pike-perch) |
| 03042011 | Frozen fillets of trout | Free | |
| 03041091 | Other fresh or chilled meat of freshwater fish other than trout | Free | 90 |
| 03054100 | Smoked salmon | Free | 50 |
| 030549 | Smoked fish including fillets excl.salmon and herrings | Free | 50 |
| 03073110 | Mussels live, fresh or chilled | Free | 40 |
| 03073910 | Mussels frozen | Free | |
| 03079913 | Striped venus and other species of the genus <i>Veneridae</i> , frozen | Free | 160 |
| 16041200 | Prepared or preserved herrings | Free | 50 |
| 16041300 | Prepared or preserved sardines, sardinella and brisling or sprats | Free | 80 |
| 16041500 | Prepared or preserved mackerel | Free | 100 |
| 16041910 | Prepared or preserved fish, other | Free | 150 |
| 16041991 | Other, fillets coated | Free | |
| 16041992 | Cod | Free | |
| 16041993 | Coalfish | Free | |
| 16041994 | Hake | Free | |
| 16042000 | Other prepared or preserved fish | Free | |
| 16042000 | Prepared of preserved shrimps and prawns | Free | |
| 16059000 | Other molluscs and aquatic invertebrates | Free | 90 |

Table 37: EU/Bulgaria Association Agreement - Imports into the European Community from Bulgaria subject to concessionary rates

The important features of the tariff regime for fishery products under the Association Agreement are that it provides

- for a duty free trade for 1,000 tonnes of shrimp for peeling in Bulgaria, and for subsequent re-export to the EU
- duty free supplies of significant quantities of mackerel as raw material for the fish processing sector
- a modest duty protection to the Black Sea fishers against imports of sprat during the period prior to accession.

6 LEGAL AND INSTITUTIONAL FRAMEWORK FOR THE FISHERY SECTOR

6.1 National Agency for Fisheries and Aquaculture

The NAFA is established under the Decree of the Council of Ministers and empowered by the Fishery and Aquaculture Act 2001 to be responsible for the management of commercial and recreational fisheries in Bulgarian waters. The Agency has a staff complement of 210, and is presently recruiting to fill all posts. There are twenty-seven regional offices (seven of which are fully operational), responsible for field monitoring, control and surveillance activities. The central administration comprises five units responsible for financial affairs, legislation, administration, European integration and fisheries control.

6.2 Fisheries Research

Fisheries research is the responsibility of the Institute of Fisheries and Aquaculture, based in Varna. In 2001, this was merged with the Institute of Fresh Water Fisheries in Plovdiv. The institute has 22 scientists (12 marine and 10 freshwater). The principal responsibilities are stock assessment and research into marine ecology, and the provision of policy advice to government. In addition the Institute undertakes a number of development projects, principally related to aquaculture.

6.3 Fisheries Law

The Fishery and Aquaculture Act 2001 (State Gazette 41/2001) provides the legal basis for the management, conservation and use of Bulgarian fisheries resources. It requires the establishment of a National Fisheries and Aquaculture Programme, which provides objectives, policy framework and programmes for resource conservation, structural adjustment and market organisation, along with funding and support measures. This corresponds to an operational programme within the context of the European Unions Common Fisheries Policy, and will be prepared and adopted by April 2002.

The Act also established responsibilities for the overall management of the fishery sector, and defines the responsibilities of the NAFA. It establishes a Scientific and Technical Fisheries and Aquaculture Council as an advisory body to the Minister comprising of sector stakeholders. It provides for the establishments of Producer Organisations and a framework for orderly marketing. It also introduces a requirement for declaration of origin and veterinary certification of fish at the point of production. The Act establishes the broad terms of the control of commercial and recreational fisheries through a system of licences, and for registration of aquaculture installations. It permits the levy of fees for such licences, and provides for these fees to be used to support the management and conservation of resources. A number of detailed regulations to implement the provisions of the Act are now in preparation.

6.4 Conservation measures

Specific measures for the conservation of fish stocks, both inland, and marine, are contained in Joint MEWR and MAFAR Order RD-09-837, of 1998. This details a

number of specific measures for fishing in the Black Sea, Danube River and other inland water basins. These relate to closed seasons, fishing gear restrictions and area restrictions. These measures are based on the scientific recommendations of the Institute of Fisheries and Aquaculture in Varna. The Order also provides for sports fishing. The regulation imposes some gear limitations and sets minimum sizes for a number of the most important species.

In addition, in 1999 a quota system was introduced for turbot, imposing a national limit on catches (Ordinance RD09- 13 of the Ministry of Agriculture, Forestry and Agrarian reform). Catches appear stable in recent years, between 60 and 70 tonnes per year. MAFAR Ordinance No RD 09-837 requires that fishing is prohibited during the spawning season April to June, and there are limits on mesh size (180mm). Recent strengthening of the staffing of the NAFA is expected to ensure that the quotas are observed.

Fishing for sturgeon in the River Danube is monitored according to the CITES Treaty obligations, with detailed logbook recording of catches by species and location. Catches appear stable in the region of 35 to 50 tonnes per year. In addition the Ministry of Environment and Waters undertakes a restocking programme for sturgeon in the Danube River (funded by fishing licence receipts). In 1999, 26,700 sturgeon fingerlings were released.

6.5 Fishing vessel register

The Merchant Shipping Code is being revised in accordance with Council Regulation 2930/86 relating to the establishment of fishing vessel registers. This will ensure that the register records all fishing vessels separately, that data on their size and capacity is collected in a uniform and standardised manner, and that the data is held in a form which can be readily aggregated. The fishing vessel register is managed by the Ministry of Transport, Maritime Administration but subject to managerial consultation with the NAFA. Equipment and training for the development of the fishing vessel register was supported by an EU Phare project that finished in 2000.

6.6 International agreements and conventions

On accession to the EU, the international duties and obligations of Member States are acceded to the Council of Ministers, which represents the collective international fisheries interests of the EU.

Bulgaria is a member of NAFO (North West Atlantic Fisheries Organisation) and NEAFC (North East Atlantic Fisheries Council), and wishes to retain the fishing rights associated with membership on accession to the EU. There is also a bilateral fisheries agreement with Canada.

Closer to home, Bulgaria strongly supports the development of a Black Sea Fisheries Commission, with a view to introducing effective resource management, at international level, of the shared stocks of fish species in the Black Sea. It now appears that the Fisheries Commission will be developed under the responsibility of

the Black Sea Economic Cooperation Council. A draft treaty is under consideration and negotiations are continuing, albeit at a slow pace. The European Union will take over Bulgarian treaty responsibilities and quotas on accession.

6.7 Industry representation

The Bulgarian Fisheries Association represents marine fishing and processing companies. There is no collective representation of fishermen or fish processing workers. Those involved in aquaculture have an informal association which is in the process of development into a formal body.

6.8 Training and skills development

Trakia University in Stara Zagora will introduce a degree course in Aquaculture in 2003. However there is no institutional base at present for skills training to serve the fishery sector in general.

7 ANALYSIS OF STRENGTHS WEAKNESSES OPPORTUNITIES AND THREATS

| | Resources and management | Marine fishing | Processing | Markets | Freshwater fishing | Aquaculture |
|-------------------|--|--|---|--|--|---|
| Strengths | Good technical base for resource assessment in Fisheries Resource Institute | Main economic resources of sprat and <i>Rapana</i> spp. re only partially utilised. | Historical experience of wide range of fish processing technologies Highly competitive internationally due to low cost of manual labour | Fish is well accepted by consumers; low per capita consumption with potential for increase. Good private sector distribution system for frozen fish | Resource base not over exploited | Good climatic conditions and marine coastal topography for production. |
| Weaknesses | Weak links between fisheries research, industry and policy makers in matching resources to fishing licenses and quotas. Possible excess fleet capacity in some sectors, which leads to over exploitation of coastal resources | High temperatures during main catching season increases storage and distribution costs. Lack of infrastructure for first sale (port markets and ice plants) limits potential for distribution away from coastal regions. Inefficient catching sector; high proportion of inefficient, old, and small vessels. Extensive, widely distributed coastal fleet, with low level of technology, excessive fragmentation of fishing enterprises and lack of organisation. | Low standards of quality, food safety and compliance with EU Directives Low degree of integration between catching, processing and marketing enterprises Lack of access to capital for investment in upgrading of establishments. | Seasonal demand pattern with December peak corresponding to lack of supplies from aquaculture and marine fisheries Lack of inland facilities for wholesale distribution of fresh and live fish from marine fisheries and aquaculture. | Low level of productivity and geographically widely dispersed production precludes organised marketing Low demand for most species results in fishing at subsistence levels | Weak policy framework for development due to lack of verifiable data on size and activities of sector Lack of technological knowledge for improvements in efficiency and diversification Lack of organised marketing eliminates profitability of least efficient farms Sector decapitalised with no access to capital or collateral for investment |

| | | | | | | |
|----------------------|--|---|---|--|---|--|
| Opportunities | <p>Possibility of under-exploited resources of small pelagic fish and molluscs</p> | <p>Investment in market infrastructure and processing will create demand resulting in increased exploitation and improved incomes.</p> <p>Development of Producer organisations will result in orderly marketing and concentration of landings at main landing sites.</p> | <p>EU association agreement provides duty free access to the EU markets.</p> <p>Reprocessing of imported raw material in labour intensive processes (e.g. shrimp peeling, tuna canning)</p> | <p>Supermarkets with rising share of food shopping presents new distribution opportunities</p> <p>Improving road distribution system provides good access to internal national and international markets</p> | <p>None</p> | <p>Improved marketing opportunities for aquaculture products through supermarkets</p> <p>Diversification of production into higher value species such as sturgeon and crayfish</p> |
| Threats | <p>Permanent damage to high-value coastal fishery resources (turbot and sturgeon) due to over-fishing.</p> | <p>High unemployment in coastal regions results in uncontrolled and unlicensed fishing.</p> <p>Excessive exploitation of migratory stocks by other Black Sea fishing nations.</p> | <p>Adoption of EU tariff regime will provide strong competition to domestic processors</p> | <p>Consumers presented with a widening choice of imported foods, changes in life style of younger households</p> | <p>Some species may be subject to overfishing (e.g. sturgeon)</p> | <p>Permanent closure of small scale aquaculture producers; loss of skills and productive capacity</p> |

8 CONCLUSIONS - STRUCTURAL CHARACTERISTICS OF FISHERY SECTOR

The size of the sector is relatively small, and not of national strategic significance. The fishery sector accounts for only 0.14% of GDP, and employs about 12,000 people. In Bulgaria per capita fish consumption is about 2 kg/year one sixth of the global average. The fishery sector is however of significance in some regions where there are high rates of dependency on fishing, aquaculture and fish processing.

8.1 Marine fishing

About 3,400 persons are employed in coastal fishing in the Black Sea. The most dependent municipalities are those of Primorsko (Burgas Region), and Bjala in Varna region. These are the regions where structural adjustment in the sector can be expected to have the greatest social impacts. Burgas and Varna, are not as dependent, but have significant numbers of jobs in fishing and processing.

In terms of resources, the main Black Sea fish species of commercial significance are under-exploited. Catches of sprat are only a fraction of the sustainable yield, providing potential for increasing landings and productivity of the coastal fleet. Recently introduced conservation measures in the Fisheries and Aquaculture Law 2001, will reduce level of exploitation on the *Rapana*, which in any case is not thought to be over-exploited.

Fleet structure is highly polarised with an excess of small vessels, each operated by one or two individuals, with incomes at or below subsistence levels. Inefficiencies in catching result in very low returns in investment. Vessel owners have little or no access to credit facilities or to collateral. Although commercial opportunities do exist, the rate of development of the sector is slow.

A major constraint on the coastal fishing sector is due to lack of organisation in the marketing system. There are no defined places or times for landing sites or markets of first sale, with the result that marketing options for fishers are limited to local sales or to an oligarchy of wholesalers. Most sprat, which comprises more than 90% of the landings of fish, is sold to processing establishments where it is frozen for subsequent secondary processing or "fresh" sale at inland markets. Inland, there are few regionally based wholesalers of fresh fish, and again no regular or local supplies of fish and consumers have only limited access to this product. There are opportunities to radically reform fish marketing through introduction of new infrastructure and improved organisation to enable distribution of fish in good condition, especially during summer months when catch rates are highest. This could be expected to restore historically higher levels of fish consumption, and improve (sprat) resource exploitation and incomes to fishers.

8.2 Fish processing

Over 2,250 were employed in fish processing in 1999. Fish processing was a relatively buoyant sector, with a strong export orientation. Processing of *Rapana* is important in coastal regions, particularly in Sozopol and Balçik. Bulgaria has also had a strategic advantage with low wages for skilled fish processing labour, and has had an active business in the reprocessing of imported raw material such as shrimp and anchovy. Investment in plant upgrading is needed to meet EU hygiene requirements, and at present only four out of 17 principle fish processing establishments essentially comply with the requirements. However two major events have combined to reduce employment to a predicted level of only 700 by the end of 2001.

In terms of exports, the loss of access to the EU markets in 1999 has had a disastrous effect on the fishery sector. The main impact has been a loss of over 1,000 fish processing jobs in shrimp peeling, small pelagic processing and trout processing. In addition, aquaculture production (both carp and trout) has suffered loss of markets, although in both case alternatives have been found. Restoration of the market access should be a priority, and businesses which have moved processing activities to other countries should be encouraged to return.

Secondly, conservation measures introduced to ban fishing for *Rapana* with dredges mean that landings will decrease by an estimated 75%, with a corresponding loss of about 600 fish processing jobs (and at least 350 in fishing, but possibly many more). The impact of these changes in fish processing has mainly fallen on women in rural and coastal areas with no alternative employment opportunities. The conservation measure was introduced without full knowledge of the socio-economic impacts, and it would seem appropriate to undertake a more detailed study of the costs and benefits.

8.3 Aquaculture

There are two main aquaculture sectors; trout and carp. The trout sector, with annual production about 1,200 tonnes, employs an estimated 180 staff in 3 large and 20-30 smaller farms. Activity is concentrated in the Smolyan region. Intensive production technology in raceways is largely reliant on imported inputs (juveniles and feeds) which account for the majority of the production costs. The domestic market accounts for about 20% of sales, but prices and returns are low. The sector is mainly export orientated, where the main competitive advantage is the low processing wages for production of smoked trout fillets. Loss of the EU market has caused difficulties, but temporary (less profitable) alternatives have been found. Development of the sector is limited by availability of suitable water supply, and no increases in production can be expected. However restoration of the EU market will enable further investment in improvements in efficiency.

The carp sector has an annual production of about 7,000 tonnes in 1999, employs an estimated 4,800 people in 100 large and up to 300 smaller farms. Production was much higher in the past (15,000 tonnes in the 1980s). Activity is concentrated in the regions of Plovdiv, Stara Zagora, Hoskovo and Yanboul. The sector uses extensive or

semi-intensive polyculture techniques in ponds and lakes. It is reliant on domestic inputs (juveniles and feeds) which account for the majority of the production costs. The domestic market accounts for almost 100% of sales, and prices and returns are low. There is a lack of working capital, and the smaller farmers lack the expertise to utilise intensive technologies and improve efficiency. The marketing system is poorly developed, with a lack of organisation between aquaculture producers (for example to provide market information). In the absence of appropriate inland wholesale markets, there are no formal channels for marketing. In 2000 many small farms have found it difficult to break even and some are reported to have closed. Opportunities for diversification into higher value species with export potential (such as sturgeon and crayfish) are limited by lack of technical skills and support.

8.4 Inland fisheries

Inland fisheries in Bulgaria are relatively small, with annual production in the region of 1,000 tonnes in recent years. Production is widely dispersed, along the Danube River and many inland lakes and rivers. An estimated 1,620 fishers participate in Danube fisheries, but 60% are part-time or retired persons. Except for some high value species (such as sturgeon) most of the catches are marketed and consumed locally. Incomes from fishing are low, but there are few opportunities for increased production or improved marketing.

ANNEX 1: LIST OF FISH PROCESSING ESTABLISHMENTS IN BULGARIA

A1.1: Fish processing establishments with EU approval number

| | | |
|---|-------------------------|------------|
| 1 | EURO-PESKA EOOD | SVILENGRAD |
| 2 | KD SALVELINUS REYA FISH | DOSPAT |
| 3 | ET MAXIM KERANOV | NOVO SELO |
| 4 | PERPEN CHOBANOV OOD | BOLYARCI |

A1.2: Other major fish processing establishments

| | | | |
|---|------------------|--|------------|
| 1 | SLAVYANKA AD | BOURGAS INDUSTRIALNA STREET, 3, TEL.: (056) 842713 | BG 0213002 |
| 2 | SD DING | BOURGAS INDUSTRIALNA STREET, 3, | BG 0213006 |
| 3 | ELEKTRA EOOD | VARNA | |
| 4 | SEVER EXPORT OOD | VARNA | |
| 5 | REYA FISH | SAMOKOV | |
| 6 | PAL BG EOOD | BEDEN | |
| 7 | PAL | DEVIN | |
| 8 | CHIPELARA | CHIPELARA | |

A1.3: Other establishments registered with National Veterinary Service

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| BOURGAS REGION | | | |
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|---|--------------------------------------|---|------------|
| 2 | BLACK SEA FISHING EAD | BOURGAS INDUSTRIALNA STREET, 3, TEL. (056) 840459 | |
| 3 | FRESHWATER FISH FARMING AD | BOURGAS INDUSTRIALNA STREET, 3, TEL. (056) 841547 | BG 0213005 |
| 5 | SD KALMAR - MB | BOURGAS TEL.: (056) 45462 | BG 0213008 |
| 6 | SD LIDING – YANCHEV, TODOROV, KOSTOV | BOURGAS | |
| 7 | ET SASHO&DIDA | BOURGAS | |
| 8 | ET GEORGI MARTINOV | NESEBAR | |
| 9 | ET RUSTO-IVAN RUSEV | KARNOBAT | |

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|----|-----------------------|---------|--|
| 10 | ET DAND | BOURGAS | |
| 11 | ET DESISLAVA&KALOYAN | BOURGAS | |
| 12 | ET GIEN-C | BOURGAS | |
| 13 | CONSORCIUM RIBEKS OOD | SOZOPOL | |
| 14 | SD ANADA | NESEBAR | |
| 15 | ET RIBKOM | BOURGAS | |

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| VARNA REGION |
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|----|---------------------------------|----------|
| 1 | ET SAHI-77 | VARNA |
| 2 | ET AVRORA 93 | VARNA |
| 3 | SD PLAVEKRA-APOLONOV | VARNA |
| 4 | ORION | VARNA |
| 5 | ET BOGOEV | VARNA |
| 6 | ET STAMBOLIS K, STAMBOLIISKI | VARNA |
| 7 | ET I. ATANASOV-MATIS | VARNA |
| 8 | TOLI FISH OOD | VARNA |
| 9 | ET RADO 1965 | VARNA |
| 10 | ET ALEXITA-FISH | VAGLEN |
| 11 | SD ARIEL -2600 | VARNA |
| 12 | ET VEKIDO - 77 | EZEROVO |
| 14 | VARNA FISH ODD | BELOSLAV |
| 16 | ET KOSHI 777 | KAZASHKO |

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| DOBRICH REGION |
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| | | |
|---|-------------------|----------|
| 1 | KONSORCIUM RIBEKS | BALCHIK |
| 2 | DALBOKA OOD | KAVARNA |
| 3 | BULRIB OOD | RIBARICA |

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| PLOVDIV REGION |
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| | | |
|---|-------------------------------|-----------|
| 1 | ET IVELINA YANEVA | KARADGOVO |
| 2 | ET DIYANIS 91 | PLOVDIV |
| 3 | ET TATKO BARBA-D. BARBANOV | PLOVDIV |

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| ROUSSE REGION |
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|---|------------------|--------|
| 1 | ET NIVO - PT | ROUSSE |
| 2 | KLER EOOD | ROUSSE |
| 3 | ET NEDELICHEV 92 | ROUSSE |

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|--------|
| SLIVEN |
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| | | |
|---|----------|----------|
| 1 | ET DELTA | KRUSHARE |
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| SMOLYAN |
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| 1 | ET NIK-60 | HVOINA |
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| SOFIA |
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|---|--------------------------|-------|
| 1 | ET NRL-NIKOLAI PEINOVSKI | SOFIA |
| 2 | ET ALTO | SOFIA |
| 3 | ET DESI - 13 | SOFIA |

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| SHUMEN REGION |
|---------------|

| | | |
|---|------------------------------|--------|
| 1 | ET DID-DANIELA GELEGCHEVA | SHUMEN |
|---|------------------------------|--------|