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Overview of markets and marketing strategies in
Greece, Romania, Turkey and Ukraine

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TABLE OF CONTENTS

1. INTRODUCTION	4
2. GREECE	4
2.1. Characteristics, Structure and Resources of the sector in Greece.....	4
2.1.1. State of the art of the aquaculture sector	4
2.1.2. Specific characteristics	5
2.2. Market research	6
2.2.1. Selling fingerlings to other producers.....	6
2.2.2. Street markets.....	9
2.2.3. Selling live or processed fish to restaurants	10
2.2.4. Groceries or live for pond stocking	11
2.2.5. Food-size sport fish or ornamental fish	11
2.3. Promotion and business-oriented approach in Greece	12
2.3.1. Marketing strategy.....	12
2.3.2. Product - variety, quality, design, features, brand name, packaging, services	13
2.3.3. Price - list price, discounts, incentives, payment period, credit terms	15
2.3.4. Place - channels, coverage, assortments, locations, inventory, transportation, logistics	18
2.3.5. Promotion - advertising, personal selling, sales promotion, public relations	19
2.4. Marketing strategy in the Region of Eastern Macedonia and Thrace	21
2.4.1. Regional Agri-Food Partnership in the REMTH	21
2.4.2. Fisheries Cooperative of the Prefecture of Kavala	22
2.4.3. Price - list price, discounts, incentives, payment period, credit terms	22
2.5. Marketing plan	24
2.5.1. Executive summary – resources existent.....	25
2.5.2. Target consumers.....	25
2.5.3. Selling strategy	26
2.5.4. Pricing and positioning strategy.....	26
2.5.5. Distribution plan	26
2.5.6. Offers.....	28
2.5.7. Marketing materials.....	28
2.5.8. Promotion strategies	28
2.5.9. Financial projection.....	29
2.6. Proposals for the promotion of fishing in the Region of Eastern Macedonia and Thrace	31
2.6.1. Promotion of a regional brand name for aquaculture	31
2.6.2. Promotion of the Region.....	31
2.6.3. General organization.....	32
2.7. Conclusions.....	32
3. ROMANIA	33
3.1. Characteristics, Structure and Resources of the sector	33
3.2. Specific characteristics at the national level	34
3.3. Management and promotion of the aquaculture sector	34



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3.3.1.	The Institutional Framework.....	34
3.3.2.	The Governing Regulations	35
3.3.3.	Applied Research, Education and Training	35
3.4.	Market research	35
3.4.1.	Street markets (legal standards on EU or national level)	36
3.4.2.	Selling live or processed fish to restaurants	36
3.4.3.	Groceries or live for pond stocking	37
3.4.4.	Food-size sport fish or ornamental fish using the following structure.....	37
3.4.5.	Live and processed fish markets	37
3.4.6.	Price formation	37
3.4.7.	Market controls.....	38
3.4.8.	Cold chain.....	38
3.5.	Marketing strategy	38
3.5.1.	Product - variety, quality, design, features, brand name, packaging, services	38
3.5.2.	Price - list price, discounts, incentives, payment period, credit terms	38
3.5.3.	Place - channels, coverage, assortments, locations, inventory, transportation, logistics.....	39
3.5.4.	Promotion - advertising, personal selling, sales promotion, public relations	39
3.6.	Marketing plan	40
3.6.1.	Executive summary – resources existent.....	40
3.6.2.	Target consumers.....	40
3.6.3.	Selling strategy	41
3.6.4.	Pricing and positioning strategy.....	41
3.6.5.	Distribution plan	42
3.6.6.	Offers building.....	42
3.6.7.	Marketing materials.....	42
3.6.8.	Promotions strategies.....	42
3.6.9.	Financial projection.....	42
3.7.	Marketing strategies	42
4.	TURKEY	43
4.1.	Characteristics and structure of the sector.....	43
4.1.1.	State of aquaculture production.....	43
4.1.2.	Specific characteristics	44
4.2.	Market research	46
4.2.1.	Juvenile supply	46
4.2.2.	Street markets/ local fish shops/ wholesale markets.....	47
4.2.3.	Selling live or processed fish to restaurants	49
4.2.4.	Groceries or live for pond stocking	49
4.2.5.	Sports (amateur) fishing	50
4.3.	Marketing channels of fish and fishery products in Turkey.....	50
4.3.1.	Markets and price	52
4.3.2.	Product types in markets	53
4.3.3.	Prices of fish for farming.....	55



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- 4.4. Research and Innovation.....55
- 4.5. Regulations for fish markets and farmed products56
 - 4.5.1. Regulation on Wholesale and Retail Fish Sales56
 - 4.5.2. Communication for supporting processed fishery products58
 - 4.5.3. Instructions for permit of export to fishery business enterprises and issuing a health certificate for the products.....58
 - 4.5.4. Live, fresh, cooled and frozen products import instructions.....59
- 4.6. Administrative bodies and supportive organizations in marketing59
- 4.7. Certificates in farming, processing and marketing60
- 4.8. A business plan for marketing in aquaculture industry60
- 4.9. Further developments in aquaculture for production and marketing62
- 4.10. Conclusion63
- 5. UKRAINE63**
 - 5.1. Production and consumption.....63
 - 5.2. Development of aquaculture industry65
 - 5.3. Aquaculture business development.....66
- REFERENCES68**



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1. INTRODUCTION

Marketing is the key factor for any type of production. Market oriented production methods are essential for the benefit of producers almost in various production fields in the economy; to provide sufficient supply to cover the demands from markets in time, in place and in good conditions. This is very crucial for the aquaculture industry due to characteristics of the product; fish and other organisms are very sensitive in their different life stages, needs different care and production techniques. Supply of the other materials for farming of fish such as fish feeds, health services and existence of staff with sufficient competences is very vital during the production process. On the other hand following up of the markets for any kind of supply is also another important issue. Aquaculture industry has various types of needs in the production process; eggs, fry/juveniles, fingerlings, feed for different life stages, infrastructures for breeding (tanks, cage frames, nets, automatic feeders, cleaning devices, etc), fish processing, and freezing/cold storage units before marketing. Final need is the assessment of markets to sale production in good price with required quantity with good safety conditions. Therefore from farm to the dish, aquaculture products must have in good health and safety conditions for the benefit of the customers and sustainability of marketing of the productions for the sake of farmers. Therefore having a cold chain or to include the production in an existent cold chain system is very important in the marketing process of the industry.

This report on “Overview of markets and marketing strategies in partner countries” of fish and fish products is very important document for the producers/investors who would like to enter these markets.

2. GREECE

The present study for the overview of markets and strategic marketing in the Region of Eastern Macedonia and Thrace (EMT) and more generally in Greece contains information of the characteristics of the aquaculture sector, the management and promotion of the sector, the marketing strategy in Greece and in the Region of Eastern Macedonia and Thrace.

2.1. Characteristics, Structure and Resources of the sector in Greece

2.1.1. State of the art of the aquaculture sector

The aquaculture techniques used in Greece are the following (*European Commission, 2012*):

- **Extensive aquaculture in brackish waters:** animals that are often carried away by the current are kept in lagoons designed for this purpose. The introduction of the fish born in hatcheries and the provision of dietary supplements enhance the semi-extensive nature of this breeding. This form of aquaculture plays an important role in maintaining the natural heritage in coastal areas. Such examples are: sea bass, eel, common sole, flathead grey mullet, sturgeon, shrimp, shellfish and crustaceans.
- **Marine aquaculture in cages:** fish are kept in anchored cages which are held on the surface by a floating plastic frame. This form of breeding is mainly practiced in protected areas near to the coast, yet the most advanced techniques (diving cages, telecommunications, automatic



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feeding, etc.) make it possible to remove them. Examples: sea bass, sea bream, gilthead sea bream etc.

- **Intensive aquaculture in cages in freshwater:** concerns mainly fish lakes. Examples: carp, etc.
- **Shell farming** is based on the collection of "wild" offspring (via fishing, brood collectors) or offspring from approved hatcheries, which is fed with the nutrients offered by the environment itself (filter feeding animals). Shellfish and mussel farming account for 90% of the European production using a wide variety of techniques: bottom, slabs, wooden stakes, ropes, baskets, etc. Examples: Oysters, mussels, quinces, clams.

2.1.2. Specific characteristics

Aquaculture in Greece is a very important sector of economy. Marine farming is dynamic and contributes significantly to national economy. In the last decade, commercial fish farming has developed into one of the most developed sectors. Today, Greece ranks first between the European Union and the Mediterranean, in the production of commercial aquaculture fish, and therefore the sector ranks second in the export of "food and beverages". Twenty years ago, breeding sea bass and gilthead sea bream was virtually non-existent, but in 1981 as a result of the good climatic conditions and the extensive and protected coastline, a number of private, national and European investments were made in the sector, which combined with advances in hatching technologies and food, took off the industry by reaching a production of 115,000 tons by 2008, corresponding to € 376,000,000 gains. About 70% of this production and 90% of the value comes from marine fish. Shellfish production accounts for 25% (EUMOFA, 2018).

In Greece, the predominant species, from 1956 onwards, is the rainbow trout (about 3,000 tons/year), while in the past 15 years an attempt has been made to breed eel, sturgeon, mullet (Mugilidae) and ornamental fish. Sea bream (Gilthead seabream, *Sparus aurata*) and sea bass (European seabass, *Dicentrarchus labrax*) are the main species bred in Greece. In addition, 910 tons of fish farmed in lagoons corresponding to 5,000,000€ gains. The producers make significant efforts to differentiate themselves by trying to farm other species such as sharpnose seabream (*Diplodus puntazzo*), common dentex (*Dentex dentex*), red porgy (*Pagrus pagrus*), white seabream (*Diplodus sargus*), common Pandora (*Pagellus erythrinus*) and common sole (*Solea solea*), with a total production reaching 1,800 tons in 2008. For these species, the production of offspring in fish-generating plants was developed.

About 80% of Greek aquaculture production is, mainly exported to Italy and Spain. Fish, mainly sea bass and gilthead sea bream, is the second most exported agricultural product after olive oil, and is considered as a product of a strategic significance by the Greek government. Production is mainly achieved with the use of sea cages and the production costs are among the lowest in Europe due to favorable breeding conditions (temperature, leeward bays, long coastline, etc.). Production sites exist throughout the Greek coastline, presenting a higher concentration in the central areas close to proper infrastructure and road network.

The main species currently farmed in Greece are the following, with a declining production volume:

1. Gilthead seabream (*Sparus aurata*)



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2. European seabass (*Dicentrarchus labrax*)
3. Rainbow trout (*Onchorynchus mykiss*)
4. European eel (*Anguilla anguilla*)
5. Sharpsnout seabream (*Diplodus puntazzo*)
6. Red porgy (*Pagrus pagrus*)
7. Common pandora (*Pagellus erythrinus*)
8. White seabream (*Diplodus sargus*)
9. Atlantic bluefin tuna (*Thynnus thynnus*)
10. Common sole (*Solea solea*)
11. Flathead grey mullet (*Mugil cephalus*)
12. Common dentex (*Dentex dentex*)

The first two species cover 95% of the total production in Greece, leaving the rest being produced in very small quantities. Aquaculture is an important sector in Greece, accounting for more than 50% of total fisheries production. In 2008, the production amounted to 115.000 tons, corresponding to € 376,000,000 (Μπασιούλη, 2014).

Research on aquaculture for the Greek Ministry of Rural Development and Food is carried out by the Center for Fisheries and Aquaculture Research in Kavala under the auspices of the National Agricultural Research Foundation.

Through the AQUAEXCEL network, Greek researchers have access to the European research aquaculture infrastructure. Through the Regional Platform of Greek Aquaculture and Innovation Platform (HATiP), Greece contributes to the European Water Innovation Platform (EATiP) supported by the AQUAINNOVA action of EU FP7. In this way, the industrial vision for sustainable future development is linked so as to satisfy the demand of seafood, always with the aim for research and development. As a result, Greece's leading position is expected to strengthen. Nevertheless, the average level of education for most of the workers employed in aquaculture remains low and the industry is still considered by many to be a primary, non-specialized industry¹.

2.2. Market research

2.2.1. Selling fingerlings to other producers

In Greece, fish producers are supplied by fish farms, mainly private or public (iridescent rainbow trout). Fish hatcheries are land facilities with high-tech systems and constructions, where the reproduction of fish takes place in a natural way and the brood is produced, and their water supply is done by the sea or by drilling. The collection of eggs by the breeders leads to hatching and breeding so that they can be turned into fish, which will then be supplied to producers. Most hatcheries have departments for:

- Brood stock
- Phytoplankton
- Zooplankton (rotifers)

¹ <https://www.aquaexcel2020.eu/>, <http://eatip.eu/>



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- Artemia hatching
- Egg hatching
- Larval rearing
- Weaning
- Development
- Ongrowing

The total duration of fish farming in hatcheries usually ranges from 90 to 120 days, until they reach a weight of 1.5 - 2 grams and are then ready to be transferred to the fattening units.

In Greece, according to the latest data published by the Federation of Greek Maricultures (FGM), there are 29 marine fish hatcheries in Greece, and in 2018 they produced about 446.8 million fingerlings with a total worth of 111 million euros, with the unit price ranging from 0.2 euros for sea bream up to 0.4 euros for meagre. Almost 97% of them, represent the production of sea bream and sea bass and 3% the production of fry for all other Mediterranean species (sharp snout seabream, pagrus, meagre). Compared to the previous year, there is a slight decrease of 2.7% in volume. More specifically, in terms of production of sea bream and sea bass, in 2018 a total of 432 million fish worth 86.4 million euros were produced. Almost 86.5% of them were placed in units in Greece and the remaining 13.5% were distributed in other countries (Spain, Croatia, Egypt, UAE, Tunisia).

More specifically, 250 million sea bream fish were produced, where compared to 2017 there is a decrease of 2.3% in terms of production volume. In terms of sea bream exports in 2018, a total of 40 million fish were exported, of which 45% in European countries (mainly Italy and Spain) and 55% in third countries.

Regarding the production of sea bass offspring, 182 million were produced, where compared to 2017 there is a decrease of 4.7% in terms of the number of fish. A total of 18 million fish were exported to other countries. According to the available data, in 2018, about 5.5 million sea bass fingerlings and 7.4 million sea bream fingerlings were imported to Greece from France. In 2019, the production of sea bream and sea bass decreased by 2.08% and a total of 423 million fingerlings were produced. In particular, 245 million sea bream and 178 million sea bass fingerlings were produced for each species (ΣΕΘ, 2019).

The Hellenic Statistical Authority (ΕΛΣΤΑΤ) announced that, in its research for the year 2018, production of trout offspring increased by 56.8% compared to 2017. Specifically, trout fingerlings in 2018 amounted to 9,384 thousand fish, compared to 5,983 thousand fish in 2017. Concerning other fish species, such as the sharp snout sea bream and the meagre increase by 8.2% in 2018 was observed, compared to year 2017. Specifically, the fry of other fish species in 2018 amounted to 16,679 thousand fish, compared to 15,408 thousand fish in 2017.

The areas where fish hatcheries operate are the following prefectures: Thesprotia, Fokida, Evia, Fthiotida, Lesvos, Chios, Etoloakarnania, Attica, Boeotia, Dodecanese and Kefallinia (Fig 1). Fish hatcheries are mainly located in coastal areas and usually belong to companies that also have floating fish farms of Mediterranean fish species and which have proceeded to verticalize their production



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(fingerling production, breeding and fish packing) (Υπουργείο Αγροτικής Ανάπτυξης και Τροφίμων, www.minagric.gr).

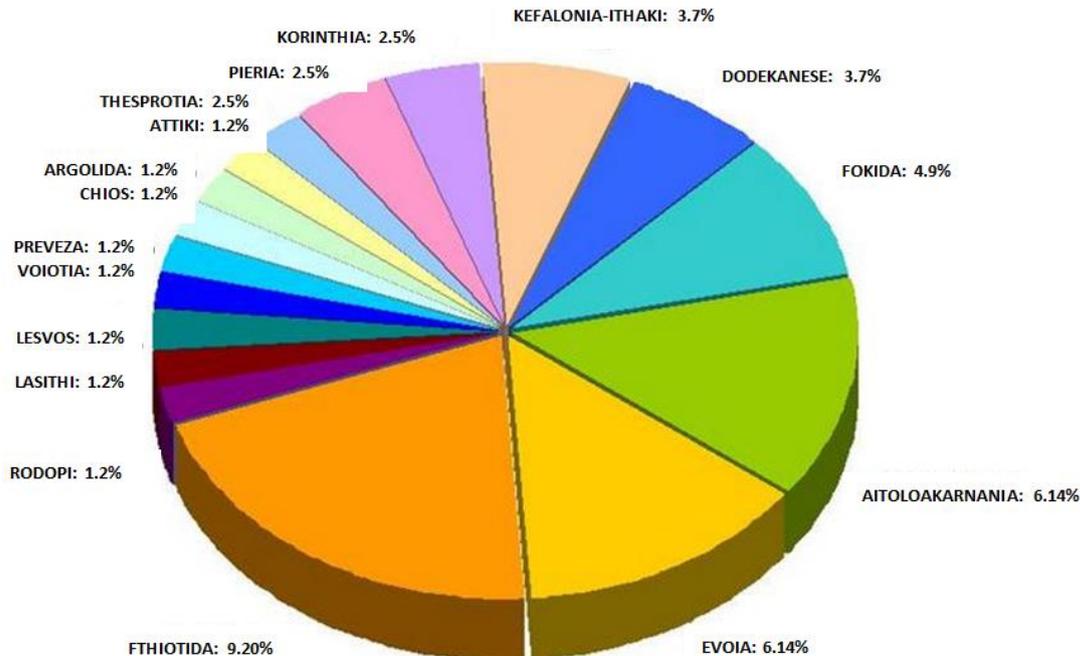


Figure 1: Geographical distribution of marine fish hatcheries (source: Gaiapedia)²

In addition to the above mentioned hatcheries owned by the private sector, State Hatcheries are Special Decentralized Fisheries Services of the Ministry of Agricultural Development and Food were established in 1990 (ΦΕΚ 159Α/ 28-11-1999) in order to implement programs of the Fisheries Directorate³. Their main activity is the production of fingerlings to enrich internal aquatic ecosystems, support new producers as well as those who have suffered certain damage from unusual disasters, carry out research in methodology of production and educational programs, implement new programs, support watercourses, support fresh water fish production, the reproduction of wild trout and other indigenous freshwater species for future enrichment of natural fish populations. The supply of fish from the State Hatcheries to producers is free of cost, under certain conditions. State Hatcheries in Greece are located in Ioannina, Pella, Drama, Preveza and Arta and produce trout, iridescent trout, golden trout, sea bass and carp, either for water enrichment or for supply to producers. The request for free procurement of fingerlings from the producer is addressed to the State Hatcheries and through the Directorate of Fisheries Applications and EAP is approved by the Secretary General of the Ministry. The General Directorate of Fisheries, taking into account the need to protect natural wildlife populations in the rivers of Greece and the need to avoid disruption of

² <http://www.gaiapedia.gr/gaiapedia/index.php/Υδατοκαλλιέργεια>

³ <http://www.alieia.minaagric.gr>



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aquatic ecosystems, approves the granting of trout fingerlings for enrichment only in artificial lakes and dam areas.

Main hatcheries belong to State are:

Fisheries Station of Ioannina Address: 45500 Chani Terrovou – Ioannina Tel/fax: 26540-71297, e-mail: jsioanninon@gmail.com	Experimental Cypress Farm – Eel Farm Address: 47100 Psathotopi - Arta Tel /Fax: 26810-42102 e-mail: pirki@otenet.gr
Fisheries Station of Pella Address: 58200 Edessa Tel /Fax:: 23810-20688/25578 e-mail: ispella@otenet.gr	Fisheries Station of Preveza Address: 48100 Pogonitsa - Preveza Tel /Fax: 26820-24016/25628 e-mail: ixsprevezas@yahoo.gr
Fisheries Station of Drama Address: 66100 Drama Tel /Fax: 25210-3579 e-mail: ixsdramas@gmail.com	

2.2.2. Street markets

Open-air street markets in Greece are active throughout its territory, and supply citizens and professionals with land food products, fresh sea/ freshwater/ aquaculture fishery products, processed food products - frozen food, etc. All open-air/ public street markets operate in every Region, Prefecture and Municipality of Greece. In order to be able to sell fish and other products from the producer through open-air street markets, it is required to issue a professional outdoor trade permit for Fresh seafood, freshwater, aquaculture. (<http://www.openqov.gr/ypoian/?p=7872> Υπουργείο Ανάπτυξης και Επενδύσεων). A list with the open-air/ public street markets can be found on the website of the Panhellenic Federation of Associations of Producers of Agricultural Products of Sellers of Public Markets, where someone can search based on the day and/ or the location where the open-air street markets are active <http://www.laikesagores.gr/laikh/agora/road/list?mode=list>.

Public Fish Auction Halls are managed within the framework of fishing legislation. Their meaning and definition is mentioned in article 24 of Law 420/1970 (ΦΕΚ 27/ Α/ 31-1-1970). The Minister of Agricultural Development and Food, as a representative of the State, may assign the administration and management with the signing of a contract and specific operating conditions. At this day, the sole management body is CMFO SA (Central Markets and Fishery Organization). Fish Fish Auction Halls are eleven and are located in Piraeus (Keratsini), Thessaloniki (Nea Michaniona), Patras, Kavala, Alexandroupolis, Kalymnos, Preveza, Chalkida, Chania (Souda), Chios and Messolonghi⁴.

Fish Auction Halls:

Fish Auction Hall of Piraeus Vassilis Katsiotis, Manager Tel: 210 4007880, 210 4325838	Fish Auction Hall of Chalkida Anastasia Voliotou, Manager Tel: 22210 25323	Fish Auction Hall of Kalymnos Konstantinos Pizanias, Manager Tel: 22430 23023
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⁴ <http://212.205.18.150/node/40>, <http://www.alieia.minagric.gr>



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Fax: 210 4007827 Email: ixth-pir@otenet.gr	Fax: 22210 76323 Email: ixthxalk@otenet.gr	Fax: 22430 50853 Email: ixth1@otenet.gr
Fish Auction Hall of Thessaloniki Dimitris Argyriadis, Manager Tel: 23920 35911, 23920 35913 Fax: 23920 35910 Email: ix-thes@otenet.gr	Fish Auction Hall of Chios Konstantinos Stoupos, Manager Tel: 22710 24376 Fax: 22710 27171 Email: ixth-xio@otenet.gr	Fish Auction Hall of Preveza Ioannis Toliadis, Manager Tel: 26820 23090 Fax: 26820 24364 Email: ixth-pre@otenet.gr
Fish Auction Hall of Kavala Charalampos Mantas, Manager Tel: 2610 321792, 2610 324258 Fax: 2610 324258 Email: ixth-pat@otenet.gr	Fish Auction Hall of Alexandroupolis Nikoleta Torosiadou, Manager Tel: 25510 25121 Fax: 25510 25120 Email: ixth-ale@otenet.gr	Fish Auction Hall of Chania Tel: 28210 80195, 28210 80194 Fax: 2821080215 Email: xanixth@otenet.gr
Fish Auction Hall of Patra Charalampos Kantzaris, Manager Tel: 2610 321792, 2610 324258 Fax: 2610 324258 Email: ixth-pat@otenet.gr		

CMFO's fishmongers' branches throughout Greece make possible (for fishermen-traders as well as consumers) the supply of the country with fresh of good quality fish. At the same time, the local economy of each region is stimulated through commercial activity that develops in and around them, assisted by value-added services, such as packaging and processing plants, which increase the value of the raw material, for the benefit of the producer and trader and facilitating export process through facilities certified by the competent services of the EU.

Fish marketed on Auction Halls and originating from fish farming accounts up to 20% of the total catches, while 10% is imported. According to the existing data of CMFO for 2019, more than 8,500 thousand tons of sea bream and sea bass, which originated from aquaculture in the country, were distributed by the Auction Halls of Piraeus, Thessaloniki, Kavala, Patras, Preveza, Chalkida, Chania⁵.

2.2.3. Selling live or processed fish to restaurants

The size of the market with fresh fish and seafood in value appears to reach € 1,230.8 million on an annual basis and is traded mainly through the retail channel (fish markets, S/M) and much less through Food Service (markets of mass catering). In recent years, freshwater distribution channels have expanded and consumers can find fresh fish not only in fish markets, but also in specially designed areas in organized retail (HM/ SM). The Retail channel (SM/ HM/ Discounters/ Small Retail, C&C, Specialized Retail) concerns the distribution of products through retail chains to final consumer and the annual turnover is estimated at € 142m. The Food Service channel accounts for 56% of the total turnover of frozen fish in the domestic market (*Enterprise Greece, 2015*).

⁵ <https://www.okaa.gr/>



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Aquacultured fish are found as whole fish but also as processed in retail in Greece and in countries where they are exported, primarily on large-scale retail stores. Fish is a highly valued product for most fishmongers and restaurants. The price of wild euryhaline species can exceed 25 euros/ kg, while the aquacultured sea bass is generally priced below the 10 euro/ kg limit ⁶.

Fish remain in cages until they reach the desired size and are fished out. The first commercial size of fish is between 300-400 grams after 1.5 to 2 years. After having been removed from the fattening units, fish are transported to the packaging plant where they are selected and sorted by size and then packaged in Styrofoam boxes, processed or not. The processing of fish concerns the process of the removal of internal organs (gutting – evisceration) and/ or exfoliation, as well as in some cases filleting. In the Greek market, sea bream and sea bass are mostly sold through large retailers, but also specialized retailers, especially in markets such as the Varvaki Central Market in Athens, although limited. Although sea bass has a lower price than sea bream for the Greek consumer, there is a great demand in the field of catering and cash & carry chains such as Metro, The Mart and Masoutis ⁷.

According to data from the European Commission's Directorate-General for Maritime Affairs and Fisheries, 37% of Europeans and 75% of Greeks prefer products of fisheries and fish farming from their own countries. The vast majority of consumers buy fish and fish products from fishmongers and supermarkets, while fewer consumers suggest fish products from popular markets or fish markets and fish auction halls⁸.

Most super markets have a specialized department for the sale of fish, which has a direct impact on the overall level of consumption. Since the end of 2014, freshly cleaned (gutted) sea bass has been offered in the Greek market and packaged. A large chain of super markets (LIDL) has developed a series of "FRESH FISH TODAY" which includes sea bass and sea bream. Cleaned sea bass (weighing 350 grams) was sold for 3.99 euros/ piece, i.e. 11.40 euros/ kg in February 2018 (sea bream was sold for 9.14 euros/ kg, at the same time). This large-scale retail company sells cleaned sea bream for 13.20 euros/ kg ⁹.

2.2.4. Groceries or live for pond stocking

This activity does not take place in Greece. It is worth noting that the enrichment of lakes with fish has in the past raised several reactions due to adverse changes in biodiversity that it may cause.

2.2.5. Food-size sport fish or ornamental fish

Amateur-sports fishing is governed by the provisions of ΠΔ 373/85 (FEK 131/ A/ 1985), of Regulation (EC) 1967/2006, as well as by those of the General Port Regulation, as it applies to the area where such fishing activity takes place. Amateur-sports fishing is fishing that aims for entertainment or sport and not for human consumption or income. Amateur fishermen must be provided with an individual amateur fishing license issued by the Port Authority. Amateur fishermen fishing on land are exempt from this obligation (*Γενικός Κανονισμός Λιμένα, άρθρο 232*).

⁶ <https://www.euromonitor.com/>

⁷ www.eumofa.eu

⁸ <https://ec.europa.eu/>

⁹ <https://www.euromonitor.com/>



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Amateur fishermen are not allowed to use sliding nets, circular nets, grids, boat drags, motorized drags, branch nets, ragged nets and a combination of bottom nets. The use of setlines for highly migratory species is also prohibited in amateur fishing.

According to Regulation (EC) No 1967/2006, Member States ensure that:

- Amateur fishing should be conducted in a manner consistent with the objectives and rules of management measures for the sustainable exploitation of fisheries resources in the Mediterranean.
- Catches of marine organisms derived from amateur fishing should not be placed on the market. However, exceptionally, it may be permitted to trade items caught at sporting events on the condition that proceeds from their sale are donated to charity.
- Measures are taken to regulate submarine fishing with a sniper rifle, in particular in order to meet the obligations set out in Article 8 (4) of this Regulation, that fishing rifles are prohibited if used in conjunction with submarine breathing apparatus (or during the night, from sunset to sunrise¹⁰).

The activity of amateur sport fishing is very promising and with economic benefits for Greece. Despite the fact that Greece has the natural wealth, so far it has not developed much. It is typical that there are several amateur fishing clubs that organize annual competitions and sport fishing festivals. Such activities take place in areas where they meet the specifications such as the artificial lake of Polyphytos in Kozani, where exclusively carp fishing takes place under certain conditions. Similar events take place in the lakes of Ioannina, Plastira and the springs of Aaos. It is worth noting that amateur sport fishing is not for commercial purposes, but is based on the "catch and release" philosophy.

2.3. Promotion and business-oriented approach in Greece

2.3.1. Marketing strategy

Some of the key conclusions on which marketing strategy and tactics are based are as follows:

- The price of the product (sea bream - sea bass) has been stabilized in recent years and is not offered as a field of intense competition.
- The product market is divided into internal and external. Domestic demand for sea bream and sea bass has been growing in recent years. The demand from abroad has to do mainly with the effort of Greek companies to be active in new markets. Thus, while the presence of Greek products in some markets (Italy mainly, but also Spain and France) has been established, an effort is being made to expand to new ones.
- In the period 2001-2005, many changes in the industry occurred; many companies were acquired while others merged, with the result that the industry now consists of a few very strong group companies and a number of other smaller companies. Entry barriers are very strong for a new company that wants to play a leading role in the industry and gain a market share of 5% -8%.

¹⁰ <http://www.alieia.minaagric.gr/node/19>



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- Companies that are already active do not significantly use advertising or any other of the marketing tools in order to promote the product. There is no differentiation in any way of the product, as it is considered as one and common. The promotion of the product is based on personal contacts and the power of the distributor (commercial company, wholesaler) with which the respective company or the privately owned distribution network that some of the companies have developed over the years.
- The aid provided by the Greek state and the European Union is sufficient. But companies need to focus on quality and environmental protection in order to take advantage of these benefits. Largest companies in the industry are ISO and HACCP certified while some of them (e.g. Selonda) are AGRO 4-1 and 4-2 certified.
- The future for the wider aquaculture sector is very favorable. As the living standard in Greece and in the rest of Europe is constantly improving, fish consumption is playing an increasingly important role in daily diet and expenses of Greek households for fresh fish are increasing (Γεωργακόπουλος, 2006).

2.3.2. Product - variety, quality, design, features, brand name, packaging, services

Greece is the main producer of Mediterranean fish and accounts for about 40% of the world production. The main species of marine fish farms in Greece are sea bream with about 55% of total fish production, sea bass with about 40%, and sharp snout sea bream, pagrus, red snapper, meagre, common dentex, tuna and others with about 5%. The size of the total domestic production of sea bream - sea bass increased in the two years 2017-2018 with an average annual rate of 6%, after an eight-year continuous (almost) decrease. Sea bream covered about 57% of domestic production in the two years 2017-2018, and sea bass the remaining 43%. Exported quantities of sea bream and sea bass covered 78% -80% of total domestic production in recent years, with Italy being the main destination for the products under review (45% of total exports) over time, followed by Spain, France and Portugal. Imports are at very low levels, and domestic consumption has risen slightly in recent years. According to the results of the ICAP study, the leading position of Greek fish farming companies in the European market of sea bream and sea bass is a strong point for the examined sector. The fact is that the climatic conditions of Greece and its morphology (large coastline, many islands) favor the development of aquaculture. Weaknesses include the large production cycle of products, which requires high capital needs in conjunction with limited fish life (available as fresh) (ICAP, 2019).

Sea bream is a fish of the Sparidae family that is found in the Mediterranean and the coasts of the Northeast Atlantic. In terms of nutritional value, along with sea bass, they are among the most valuable fish in the Mediterranean as they are rich in omega-3 fatty acids. It is one of the main fish species suitable for aquaculture and the most farmed species in the Mediterranean. The sea bream is usually 35 cm long. The sea bass belongs to the Serranidae family and is found in the Mediterranean and off the coast of the Northeast Atlantic. The sea bass usually has a length of 40-65 cm and a weight of 5-7 kg. The products of Greek aquaculture companies are intended as ready meals or fresh fish in super markets, restaurants and catering, fish shops and refrigerators of standard fish products. In addition, fish are transported whole, filleted, cleaned (gutted) or frozen.



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Organic aquaculture accounts for an extremely small percentage of Greek production as the demand for organic aquaculture products remains limited. According to the available data, the production of organic sea bream and sea bass in 2018 amounted to a total of 800 tons, representing only 0.75% of the total production of these two species. Of these, 65% were sold as organic fish (almost 530 tons), while the rest of the production was sold as conventional aquaculture fish. The main reason for the low demand for organic fish is their price, as it is almost 60% more expensive than conventional aquaculture fish. In 2018, the average price of organic sea bream and sea bass ranged at around € 8/kg. The volume of production compared to 2017 remained stable, while no change was expected in 2019. Organic production is done by 2 certified units belonging to 2 aquaculture companies, while there are 3 private Control and Certification Organizations in the field of organic aquaculture (BIOHELLAS, COSMOCERT, GMCERT) who have been approved and supervised by the Hellenic Agricultural Organization "Dimitra" (ΣΕΘ, 2019).

The trend in the wider industry is that most companies do not link their brand to the available product. In this way, the end consumer does not have direct information about the company responsible for producing these fish. The product is considered as one and companies rely on the bargaining power of intermediaries in order for their product to be promoted for sale in fish shops, super markets, catering companies, catering, etc.

Large aquaculture companies (Fig 2) have developed a traceability system that covers raw materials, internal traffic, intermediate products, processes, and finished products. Many companies in the industry implement quality systems such as ISO and HACCP and follow the AGRO 4-1 and AGRO 4-2 standards, which are supported by the Agricultural Products Certification and Supervision Organization (AGROCERT).

The AGRO 4-1 standard includes general requirements for compliance with national and Community legislation and specific requirements for generators, the origin of the fish population, fry, fish density, breeding conditions, diet, health of the fish, treatment, veterinary monitoring, development, storage, transportation, training, hygiene and safety of staff and facilities, and compliance with traceability. Based on the standard, the company is obliged to keep books and records regarding the observance of all these specifications.

AGRO 4-2 includes general requirements for compliance with national and Community legislation and special requirements for facilities, sanitary facilities, plant operation programs, cleaning and disinfection of workplaces, occupational hygiene rules and medical certificates, staff training, product evaluation criteria, packaging terms and conditions, production, storage, compliance with packaging facilities and for manufactured and stored products, and traceability. As with the previous standard, the company must keep records and books on compliance with all these specifications (Γεωργακόπουλος, 2006).



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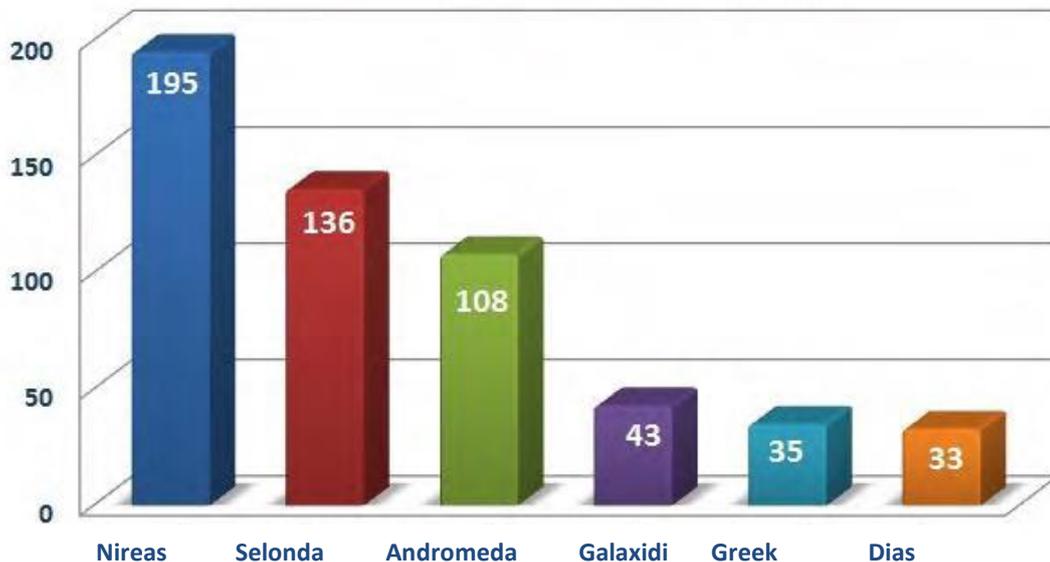


Figure 2. The largest Greek aquaculture companies based on sales 2014 (Γεωργακόπουλος, 2006)

2.3.3. Price - list price, discounts, incentives, payment period, credit terms

Factors that mainly affect the prices of the products are the seasonality of the demand and supply, the prices of the competitors but also the weight of the final product. The demand for fish is increasing during summer months mainly due to the increase in tourist traffic while decreasing respectively during winter months. Also, a large part of the production of fish farming companies is available in the market during the fall, which results in prices being under pressure during this period. Depending on the weight of the fish, the selling prices are also determined.

Aquaculture fish are considered commodity products, with volatile prices even at weekly levels, but also volatile production which depends on unbalanced factors. In 2012, the average price of sea bass amounted to € 5.10/ kg, which was an increase compared to € 4.20/ kg in 2011. Respectively, sea bream prices in 2012 were € 5.08/ kg compared to € 5.40 € in 2011 (Χαβέλας, 2015).

Prices for sea bass and sea bream in Greece in 2018 showed a declining trend for both species compared to the previous year. The average selling price of sea bream was € 4.53/ kg, showing a decrease of 1.5%, while for sea bass the average selling price was € 4.97/ kg, reduced by almost 6%. According to the available data, this trend is expected to continue, possibly fall of prices for both species, in 2019, due to the expected increased supply from third countries (Fig 3).



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Figure 3: Average price for sea bass and sea bream during the years 2011-2018 (ΣΕΘ, 2019)

In addition to the domestic Greek market, Greek aquaculture companies also supply Italy, Spain, and France. For these countries, prices are shown below (Fig 4). The average price of sea bream in Italy in 2018 was 4.45 €/ kg, i.e. reduced by 4.91% compared to 2017. The value of exports (at producer prices) amounted to 101.9 million euros, an increase of about 1.09% compared to 2017 (100.8 million euros). The average price in sea bass was 5.04 €/ kg, i.e. reduced by 7.01% compared to 2017 (Fig. 5). The value of exports (at producer prices) amounted to 100.97 million euros, a decrease of 1.94% in relation to 2017 (102.97 million euros).

The average price of sea bream in Spain in 2018 was 4.36 €/ kg, i.e. reduced by 1.13% compared to 2017 (Fig 6). The value of exports (at producer prices) amounted to 38.37 million euros, a decrease of 1,49% compared to 2017 (38.95 million euros). The average price of sea bass ranged from € 4.26/ kg, down 9.55% from 2017 (Fig. 7). The value of exports (at producer prices) amounted to € 25.32 million, a significant decrease of 6.18 % compared to 2017 (26.99 million euros).

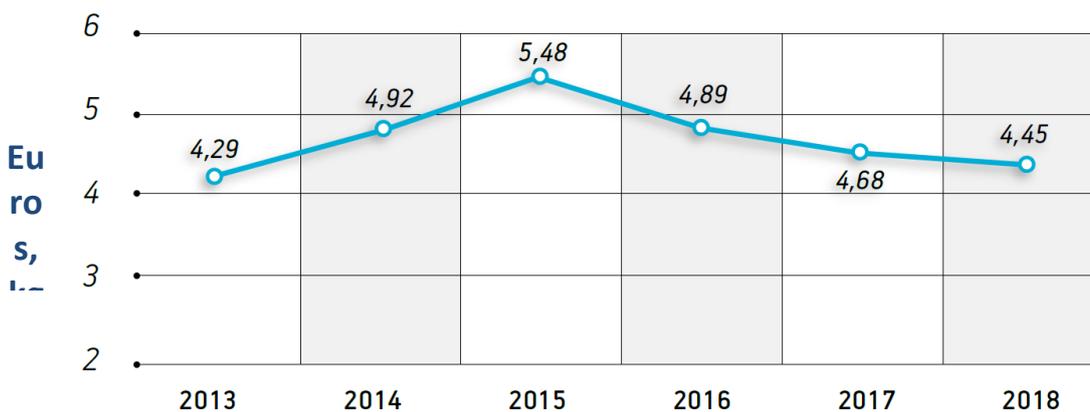


Figure 4: Average price for sea bream in Italy over the years 2013-2018 (ΣΕΘ, 2019)



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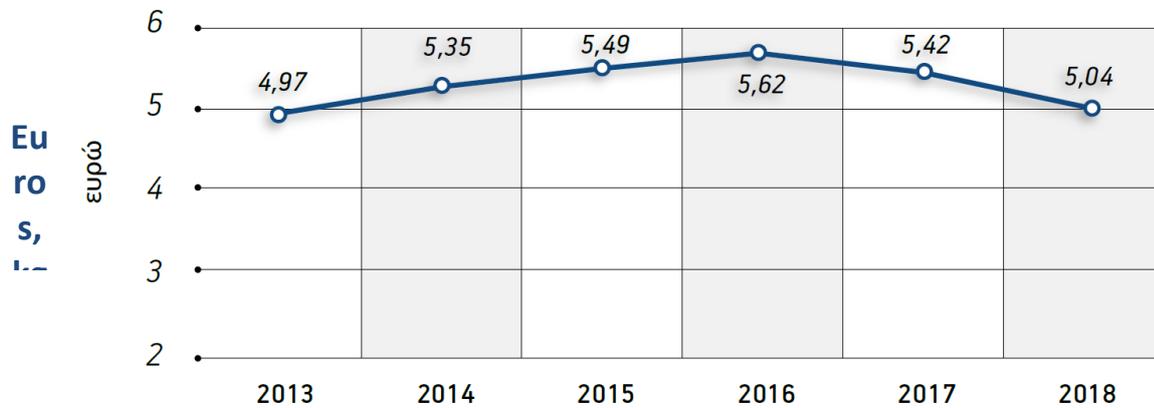


Figure 5: Average price for sea bass in Italy over the years 2013-2018 (source: ΣΕΘ, 2019)

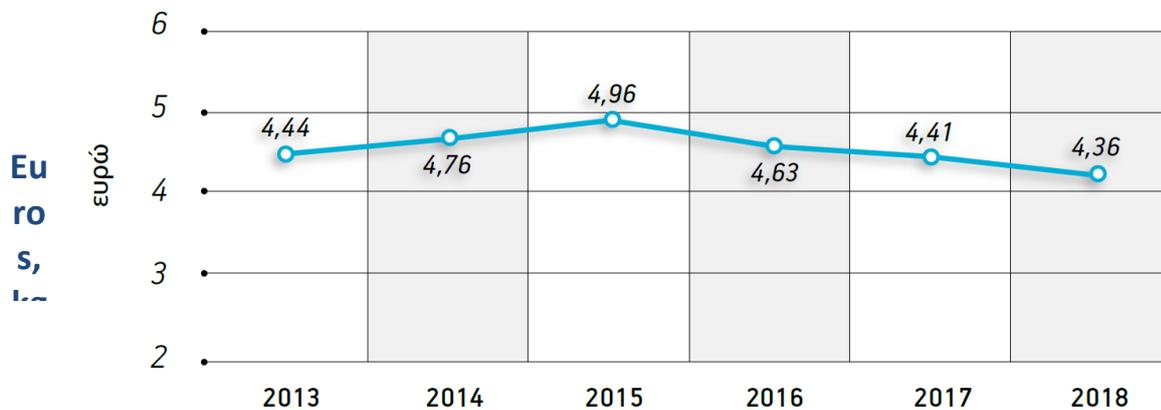


Figure 6: Average price for sea bream in Spain over the years 2013-2018 (ΣΕΘ, 2019)

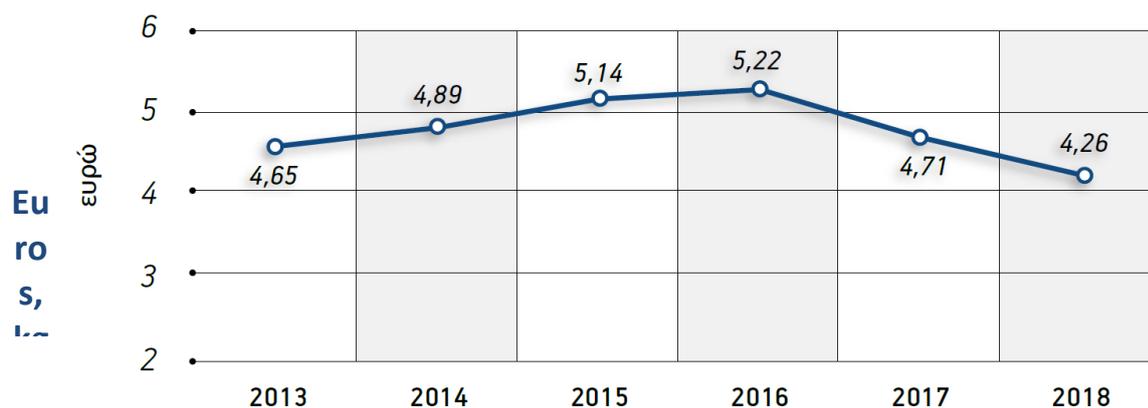


Figure 7: Average price for sea bass in Spain over the years 2013-2018 (ΣΕΘ, 2019)

The average price of sea bream in France in 2018 was 4.5 €/ kg, i.e. reduced by 2.17% compared to 2017 (Fig. 8). The value of exports (at producer prices) amounted to 31.4 million euros, a decrease of 6,8% compared to 2017 (33.7 million euros). The average price of sea bass ranged from 5.52 €/ kg,



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down 2.47% from 2017 (Fig. 9). The value of exports (at producer prices) amounted to 23.53 million euros, down 1.75% from with 2017 (23.95 million euros).

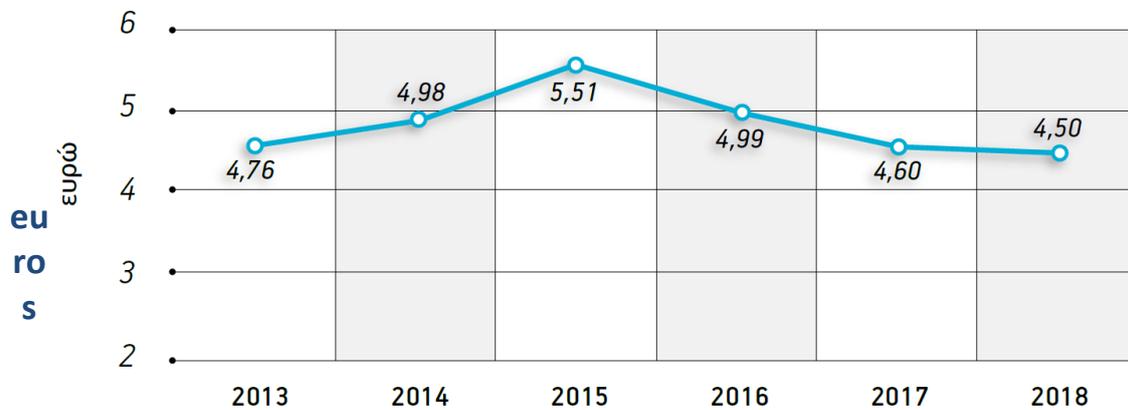


Figure 8: Average price for sea bream in France over the years 2013-2018 (ΣΕΘ, 2019)



Figure 9: Average price for sea bass in France over the years 2013-2018 (ΣΕΘ, 2019)

The terms of payment of customers as well as any granted discounts, due to the type of products and the size of the companies with which the companies cooperate, depend mainly on the quantities of orders of each customer. An average company in the market at the moment collects its receivables within 4 months (by checks with duration of usually 2 to 4 months). The company's goal is to be able to offer credit for up to 4 months, but not longer, in order not to be classified as unsecured. In addition, companies take into account certain quality characteristics, such as customer solvency, duration of cooperation, percentage of participation in sales. In any case, the need for companies to have sufficient liquidity is taken into account, so that they can cover their short-term liabilities.

2.3.4. Place - channels, coverage, assortments, locations, inventory, transportation, logistics

The location of an aquaculture unit is one of the most important features for the success of the unit. The choice of location is made after taking into account two basic requirements: a) requirements for a suitable maritime space, and b) requirements for a suitable land area to meet the broader needs of the project. Great significance is given to the correct choice of the maritime space that the unit will be installed at, due to the fact this choice greatly affects the final result of the investment plan.



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As already mentioned, the aquaculture industry uses various channels for the distribution of the final product: fish markets, fish auction halls, wholesalers, commercial companies and super markets. Many large companies-groups in the industry that have strengthened their presence in the market have extensive distribution networks as well as subsidiaries.

Deliveries of basic supplies (fingerlings, food and boxes) are made directly to plant facilities. The transport obligation is usually borne by the respective suppliers and is done by road with the transport means of suppliers themselves, while transport cost is included in the agreed prices. The total responsibility for the condition of the product until they are delivered to the unit is borne by the supplier. Transport of other supplies is made either privately owned by companies (private car) or by suppliers.

Supplies that need adequate storage space are food and packaging boxes. Boxes are usually stored in a space inside the packaging plant, while fish food is stored in a specially designed storage space. In addition, there is usually a general warehouse where the rest of the unit's equipment and supplies are stored (Γεωργακόπουλος, 2006)

2.3.5. Promotion - advertising, personal selling, sales promotion, public relations

In order for companies to promote their product, they use various elements of the promotion mix. Penetration and stay of a company in the market, due to the competition that prevails, requires the development of an intensive and effective plan of communication and sales promotion.

Personal Sale: This is the only tool in the mix used by most companies. It is the only way for a company operating in the industry to provide customers and especially intermediaries who will promote its products. In this context, personal sale emphasizes the advantages that customers will gain from the use of the product, such as increasing or maintaining profit margin (for all involved retailers-wholesalers), consistency in agreements, high product quality, etc.

Advertising: Some companies advertise their products/ services in periodicals (industry and content related to their subject matter). The purpose of these advertisements is mainly the recognition of the brand of the company by the final consumer but also by the other companies in the industry as well as by all those involved with the specific industry. A typical example is the registration of advertising by companies supporting aquaculture (transport, fish farming companies, fish farming equipment companies and fish farms, etc.) in the Annual Exhibitions of the Hellenic Marine Association (ΣΕΘ).



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for non-profit organizations, contribution to educational programs through University Institutions and Student Organizations, and sponsorships. (*Andromeda Group* <https://www.andromedagroup.eu/>, *Ιχθυοκαλλιέργειες Νηρέυς* http://www.nireus.com/1_1/arxikh-selida, *Ιχθυοτροφεία Σελόντα* <http://selonda.com/>).

2.4 Marketing strategy in the Region of Eastern Macedonia and Thrace

The effort for the development of Greek Regions goes through the possibility that they have to attract investment interest and to develop their priority sectors. Important elements are the general economic environment, legislation on the creation and operation of enterprises, the level of infrastructure, capabilities of human resources in an area, economic concentrations, geographical location, and more. However, marketing strategy also plays an important role. In the case of marketing a regional economy, the object (product) of marketing is the overall region, which as a "producer" offers products and services (*Kotler and Gertner 2002, Moilanen and Rainisto 2008*). Marketing strategists are primarily local actors such as regional and municipal authorities in collaboration with a number of other local actors (e.g. business associations, cooperatives, universities). Target groups, i.e. the recipients or the marketing market of a region, can be consumers, multinational companies, organizations, specialized human resources, tourists and citizens for their permanent establishment, research centers, educational institutions, etc (*Rainisto 2003*).

Competitive advantages have been developed in the Region of Eastern Macedonia and Thrace in terms of promoting the region's aquaculture companies.

2.4.1. Regional Agri-Food Partnership in the REMTH

At the end of 2018, the Regional Council of Eastern Macedonia and Thrace approved the establishment of the "Agri-Food Partnership" of the Region of Eastern Macedonia and Thrace. The aim of the Partnership is to record, group and promote the local products of the Region in the domestic and international markets in cooperation with local bodies, through the organization or participation in annual exhibitions and actions that bring producers and postprocessing businesses in contact with entrepreneurs. The priority of the Cooperation of the Region with the involved bodies is the promotion of the agri-food products produced in the area and the assurance of their surplus value, through the promotion of the comparative advantages of the products included in the regional "Basket", with the aim of improving the local economy and the development of the region.

It is a civil non-profit company created under the auspices of region REMTH. It is sought to give a regional dimension to the promotion of the products and a consultation group is created that proposes specific products for the "Basket of the Region", which in turn will form a network for their promotion. In this new Basket, the Region plans to include PDO and PGI but also new products that even if they do not have a specific designation, have those properties that make them valuable and competitive, and of course the conditions to become PDO.

The economic resources of the Agri-Food Partnership initially originated from the capital of the participating shareholders and in succession the Partnership supported by community programs. The main partner is the Region with a percentage of 49%, while the company can include Chambers,



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Municipalities, Production Groups and Associations of Agricultural Cooperatives, private companies that are active in the agri-food sector of the region. Working groups per regional unit are responsible for selecting local products, which are included in the basket of the Region ¹¹.

2.4.2. Fisheries Cooperative of the Prefecture of Kavala

It is worth noting that the first modern constructions in Greek lagoons began in 1980 in Kavala, such as the technical interventions in the lakes of Delta Nestos that helped to implement the Italian technology, with the construction of the first modern fish trapping facilities. Later on, they spread to the rest of the lagoons of Northern Greece and then throughout Greece. Later on, the first wintering basins were created in the lagoons, aiming to protect small sized fish that enter the lagoons for overwintering (Ετήσια Περιφερειακή Έκθεση Επιχειρηματικότητας ΚΕΤΑ ΑΜΘ).

The Agricultural Fishing Cooperative of Lagoons has been active since 1950 in the Lagoon of Keramoti of Kavala, Agiasmata, Eratinos and Vassova, fishing and offering naturally grown fish (sea bass, sea bream, blue crab, mullet, roe), which are available daily from the Fish Auction Hall of Kavala. The members of the Cooperative are about 35 fishermen. Its productive activity amounts to 150 to 180 tons of fish per year. The Cooperative's fish farm is a fenced area of the lagoon, where fishermen open the "trap doors" when the water favors the movement of fish inwards, and close them in order to trap the fish. The blue crab found in Kavala (and nowadays in the whole coastal area of the region) is indigenous in the Atlantic Ocean and thrives in the Gulf of Mexico. It was introduced to the Mediterranean in the mid-20th century. After its last appearance in the North Aegean, the blue crab is growing rapidly in population.

The Cooperative aims to develop its activity by creating a packaging plant with the possibility of smoking fish and packing the roe ("avgotaracho") according to law. The creation of the packaging plant is expected to increase the value of the products, reinforce the local economy, create new jobs and improve the working conditions of fishermen¹².

2.4.3. Price - list price, discounts, incentives, payment period, credit terms

The most recent record for the average price of fresh fish in the Region of Eastern Macedonia and Thrace concerns the Regional Unit of Kavala for the period from 11/05/20 to 21/05/2020 (Fig.10):

- Sea bream: 7,45€ (per kilogram), Sea bass: 9,11€ (per kilogram)

¹¹ <https://www.ypaithros.gr/agrodiatrofiki-simpraxi-stin-anatoliki-makedonia-thraki/>

¹² Contact Information: Tenedou 15 – Fish Auction Hall of Kavala – Office No 17

Tel: +30 2510246572, Correspondence Office Tel: +30 2510222117, Brach Tel: +30 2591051544

Email: o5lt5k@otenet.gr

<https://www.kcci.gr/memberpages/details/122/agrotikos-alieutikos-sunetairismos-limnothalasson>



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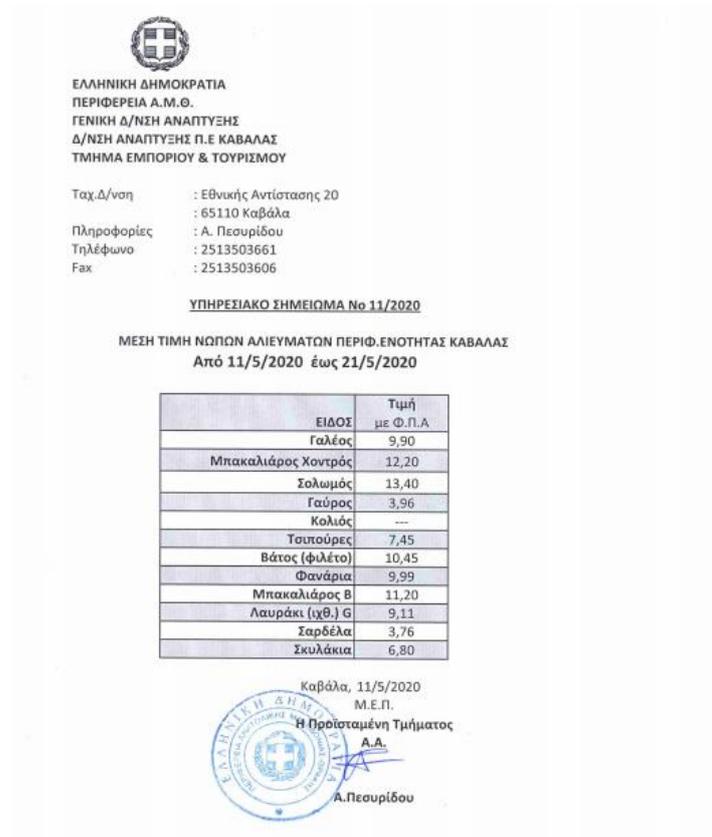


Figure 10: Average price of fresh fish in P.E. Kavala from 11/05/20 to 21/05/20 ¹³.

Also, the most recent record for the average price of fresh fish in the Regional Unit of Xanthi concerns the period from 21/04/20 to 30/04/2020 (Fig. 11):

- Aquaculture sea bream: 9,67€ (per kilogram),
- Sea bass: 13€ (per kilogram)

¹³ <https://www.pamth.gov.gr/index.php/el/enimerosi/deltia-timon/psaria/item/63145-mesi-timi-nopon-alievmaton-no-11-11-5-2020-21-5-2020>



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ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΠΕΡΙΦΕΡΕΙΑ Α.Μ.Θ.
Δ/ΝΣΗ ΑΝΑΠΤΥΞΗΣ Π.Ε. ΞΑΝΘΗΣ
ΤΜΗΜΑ ΕΜΠΟΡΙΟΥ & ΤΟΥΡΙΣΜΟΥ ΠΕ ΕΒΡΟΥ

ΘΕΜΑ: ΔΕΛΤΙΟ ΠΙΣΤΟΠΟΙΗΣΗΣ ΤΙΜΩΝ

Οι διαμορφωθείσες τιμές κατά την κατωτέρω αναφερόμενη περίοδο στα παρακάτω αναγραφόμενα είδη που προσφέρονται στις προμήθειες
ΤΙΜΟΛΗΨΙΑ ΑΛΙΕΥΜΑΤΩΝ
ΑΠΟ 21-04-2020 ΕΩΣ 30-04-2020

ΣΗΜΕΙΟ ΤΙΜΟΛΗΨΙΑΣ	Α	Β	Γ	Δ	Ε	ΜΕΣΗ ΤΙΜΗ
ΕΙΔΟΣ						
ΒΑΚΑΛΑΟΣ ΜΙΚΡΟΣ						13,67
ΒΑΚΑΛΑΟΣ ΜΕΓΑΛΟΣ						15,67
ΒΑΤΟΣ						14,67
ΒΑΤΟΣ (ΦΙΛΕΤΟ)						
ΓΑΛΕΟΣ						10,67
ΓΑΡΙΔΑ ΙΧΘ						16,50
ΓΑΡΙΔΑ ΘΑΛ.						
ΓΑΥΡΟΣ						5,00
ΓΛΩΣΣΑ ΦΙΛΕΤΟ ΚΤΨ						9,12
ΓΟΠΑ						
ΚΑΛΑΜΑΡΑΚΙΑ ΚΤΨ						5,03
ΚΕΦΑΛΙΑ ΜΙΚΡΑ						
ΚΟΛΙΟΣ						
ΛΑΒΡΑΚΙ						13,00
ΛΑΒΡΑΚΙ (ΦΙΛΕΤΟ)						
ΜΕΛΟΚΟΠΙ						15,00
ΜΠΑΚΑΛΙΑΡΟΣ ΚΤΨ						6,64

ΜΥΔΙΑ ΣΥΣΚΕΥΑΣΜΕΝΑ ΧΩΡΙΣ						7,65
ΚΕΛΥΦΟΣ 1kg						
ΠΕΡΚΑ ΦΙΛΕΤΟ ΚΤΨ						7,45
ΣΑΡΔΕΛΑ						5,00
ΣΚΟΥΜΠΡΙ						8,00
ΣΟΛΩΜΟΣ						17,50
ΤΣΙΠΟΥΡΑ ΙΧΘ.						9,67
ΤΣΙΠΟΥΡΑ ΘΑΛ.						
ΦΑΝΑΡΙΑ						14,83
ΧΕΛΙΔΟΝΩΨΑΡΑ						7,00

Figure 11: Average price of fresh fish in P.E. Xanthi from 21/04/20 to 30/04/20 ¹⁴

2.5. Marketing plan

Aquaculture companies aspire to establish themselves as companies whose brand will be synonymous with the consistency and high quality of their products. Their goal is to meet the needs of consumers with high quality products, the continuous modernization of their facilities and the expansion of their activities, so as to create more jobs, but also to use more environmentally friendly technologies, thus reciprocating their economic benefit to consumers.

The purpose is the production and distribution of aquaculture products in the Greek market but also the creation of the appropriate conditions in order to expand the activities in foreign markets. An additional goal is to plan the future course on a long-term basis and perspective (Γεωργακόπουλος, 2006).

¹⁴ <https://www.pamth.gov.gr/index.php/el/enimerosi/deltia-timon/psaria/item/62933-21-apriliou-2020-30-apriliou-2020>



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2.5.1. Executive summary – resources existent

There are about 65 fish farming companies in Greece, with 10,000 direct employees and 8,000 indirect employees. The investments of aquaculture companies reach 740,000,000 € (approximately 0.38% of the GDP). In addition, 3,258 licenses have been granted to breeding units, which are mainly located in isolated areas. At the same time, the fish feed market has developed, covering most of the domestic demand. Large companies in the industry have the ability to make direct purchases of fish feed from large foreign companies. The availability of fish feed is considered sufficient and in recent years there have been no shortages.

In order for a company to be able to operate efficiently and economically, it must have secured the availability of raw materials in the quantities described by its production program. In addition, the specific quantities must meet those quality criteria that contribute to the good quality of the final product. The domestic sea bream and sea bass fingerling market has grown rapidly in recent years, covering almost all domestic demand. It is also possible to import fry from abroad without major charges or discounts on quality. As for the quality of the domestic fry, it is characterized as excellent and is now widely recognized. Also, in addition to the supply needs of raw materials, it is necessary to continuously supply electricity, water and packaging materials, mainly during the stages of product collection and delivery to the customer. (Γεωργακόπουλος, 2006).

2.5.2. Target consumers

Customers of the products of Greek aquaculture companies can be divided into two main categories: a) domestic customers and b) foreign customers. Every year, a very large percentage of production is exported to third countries while the rest is consumed by the domestic market. Abroad, mainly the largest companies in the industry sell either directly or indirectly through commercial companies that own them. Fish consumers are people of all genders and ages and living standards throughout Greece. Customers of the Greek companies producing sea bream and sea bass also appear to buy products directly from abroad (mainly from Italy). This type of customer-companies has developed an advanced network that surveys the markets that produce products of interest, at a price that ensures profitability. Direct contact with the producer eliminates intermediate costs.

Generally, for an aquaculture business, the customer is not only the end consumer, but also all intermediaries who may seek to market the particular product. Therefore, the categorization of a company's customers could be done as follows:

- **Final Consumers:** They are the final recipients of the product to which all those involved are targeted, either directly or indirectly. Companies in the industry have set up their own retail outlets to sell directly to the end consumer.
- **Commercial Companies - Wholesalers:** They are all those who undertake to supply the market with the product they trade. Many of these companies and wholesalers have closed deals with mainly retail companies and have easy access to them, rendering them as a necessary distribution channel (customer) for many fish farming companies.
- **Retail companies:** They are all the companies - stores from where the final product is purchased by the final consumer (fish shops, super markets, etc.). The sale of the product to



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them can be done either directly by the production company or indirectly as previously mentioned through wholesalers and commercial companies.

- **Aquaculture companies:** It is very common for large companies in the industry to ask other smaller ones to produce sea bream and sea bass on their behalf, in order to then sell it mainly in foreign markets or process it (Γεωργακόπουλος, 2006).

2.5.3. Selling strategy – the concept of unique selling proposition- USP (Unique Selling proposition)

The Unique Selling Proposition refers to the unique benefit of a company, service, product or brand that allows it to stand out from its competitors. The Unique Selling Proposition should be a feature that highlights the benefits of products that make sense to consumers. Typically, uniqueness is provided by a single process, component, or system that produces the described benefit. Businesses use slogans to communicate their Unique Selling Proposition (*Entrepreneur; Laskey, 1989*).

Some examples of slogans used by big companies in the field of aquaculture operating in Greece are "Your nearby sea fisherman" of the Andromeda Group, "A global leader, your local partner" of Nireus Aquacultures, "The original selection from 1981" by Selonda Aquacultures. The communication of the slogan of a company and therefore its Unique Selling Proposition is done through the home page of its website but also in the packaging it uses (<https://www.andromedagroup.eu/>, http://www.nireus.com/1_1/axikh-selida, <http://selonda.com/>).

2.5.4. Pricing and positioning strategy

Once the target market is determined, the corresponding placement strategy is developed, i.e. the image that a company will try to create for its products, so that the target customers recognize the benefits they will have from their consumption. Due to the fact that the target market is the same target market for many competing companies, product placement must create a stronger, more exclusive and clearer image. For this reason, placement is based on the differentiation strategy and usually follows the following strategies:

- **Value for money:** the product is presented as low price and high quality, thus maximizing the value that the customer of the company perceives from its consumption. In order to implement this strategy, low operating costs must be achieved, but not at the expense of quality.
- **Product quality feature:** The product addressed to the final consumer indicates both the name of the company and the date of its catch. The goal of this strategy is to create a direct relationship of trust between the company and the end consumer (Γεωργακόπουλος, 2006).

2.5.5. Distribution plan

The aquaculture industry in Greece uses various channels for the distribution of the final product, such as fish markets, fish auction halls, wholesalers, commercial companies and super markets. The largest percentage of production is marketed through wholesalers and commercial companies. These



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companies procure and resell aquaculture products to other wholesalers or retailers and catering companies. Many large companies-groups in the industry that have strengthened their presence in the market have extensive distribution networks as well as subsidiaries (Γεωργακόπουλος, 2006).

Distribution of aquaculture products by the companies of the sector in the domestic market, as well as abroad, is carried out mainly through wholesalers (approximately 85% of the production). The aquaculture sector is among the largest exporting forces in Greece and about 80% of total production is exported to Europe (Fig. 12).

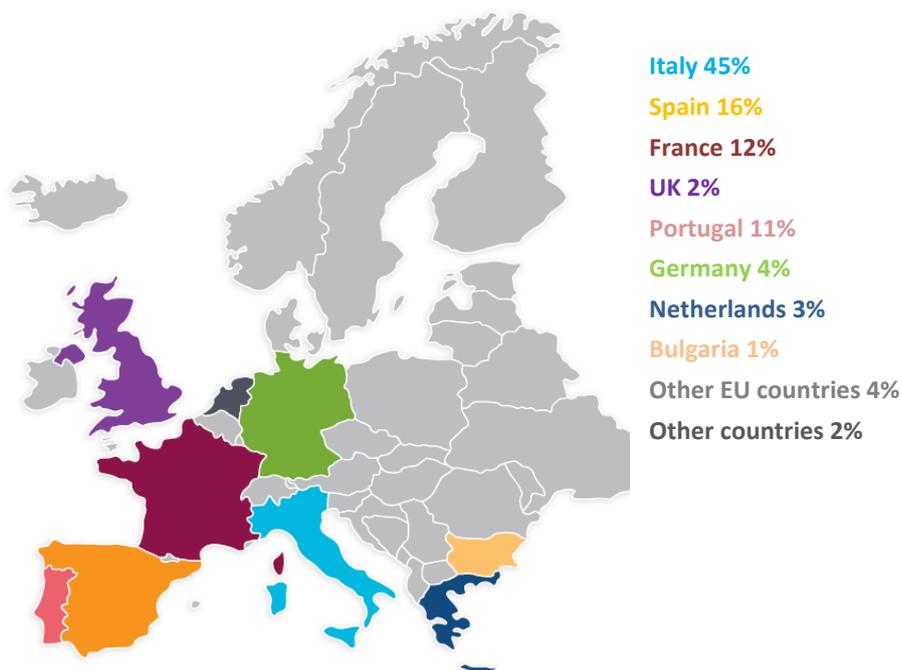


Figure 12. Exports of Greek aquaculture fish in 2018 (ΣΕΘ, 2019)

The largest companies in the sector have organized distribution networks through subsidiaries that promote them mainly abroad. In addition, these companies also sell fish on behalf of smaller companies in the industry that do not have their own distribution network. In addition to wholesalers, some companies in the industry have their products directly in fish markets and super markets (about 15% of production). The final consumer gets fish supplies from aquaculture through fish markets, fishmongers and catering establishments. Fish markets and fishmongers are the most important aquaculture network in retail. The great geographical expansion of super markets has brought significant changes in the structure of distribution networks in recent years, as consumers cover a significant part of their needs through this channel. Super markets are expected to further expand their market share in the near future, following the conditions and trends prevailing in the European market. Their ability to achieve low prices and credits from producers due to the large volume of orders, allows them to offer lower prices to consumers compared to other points of sale (ΣΕΘ, 2019).



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2.5.6. Offers

Supplies to aquaculture products in Greece depend on both seasonal demand and supply from the supply channels. Seasonal demand is affected by the fasting periods based on the official religion in Greece, and therefore there is an increase in the supply of aquaculture products during the fast before Easter (40 days), before the 25th of March, during the fast before the 15th of August (15 days) and before Christmas (30 days). During most days during the above fasts, the consumption of meat is prohibited and the consumption of fish, mollusks, shellfish and crustaceans is allowed. In addition, the consumption of these products increases during the summer months, while in the islands they are the first nutritional choice, throughout the year, due to their abundance. Therefore, the supplies of aquaculture depend on the seasonal demand, the seasonal supply, and the location of the enterprises. In addition, as mentioned above, discounts to companies depend mainly on the quantities of each customer's orders. Companies also take into account customer's creditworthiness, duration of the partnership, percentage of the customers participation in total sales, etc. (Χαβέλας, 2015; Βικιπαίδεια¹⁵).

2.5.7. Marketing materials

Promotion of the products of the industry is mainly based on the advantages that have to do with a healthy diet:

- ease of use, due to the wide variety and availability throughout the year
- quality, due to modern fishing methods, but also quality assurance thanks to modern production and packaging methods (labels)

Most common marketing materials that are used to promote aquaculture products to end consumers in Greece are the websites of companies in the industry, and television/ radio commercials mainly during fasting (Χαβέλας, 2015).

2.5.8. Promotion strategies

Enhancing competitiveness is the key to the development of the industry, especially in an environment of growing competition from imported third-country products. The Multiannual National Strategic Plan for the development of aquaculture in 2014-2020 envisages several actions with an emphasis on the implementation of collective actions to promote through Aquaculture Producers' Organizations and reduction of production costs, production through research and improvement for innovation, ensuring the quality of aquaculture products, enhancing diversification, etc. As far as the promotion strategy is concerned, the "Hellenic Organization of Aquaculture Producers" was recognized and a few months later the Production & Trading Plan was approved for the years 2018-2019, which includes an integrated promotion program which is expected to be implemented from 2019 onwards. However, the activation of the measure for the financing of the Production & Trading Plan remained pending in 2018 as well (ΣΕΘ, 2019).

Promotion strategies followed by companies in the sector in Greece include online promotion through the websites of the companies but also through internet banners on websites with high user

¹⁵ <https://el.wikipedia.org/wiki/%CE%9D%CE%B7%CF%83%CF%84%CE%B5%CE%AF%CE%B1>



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traffic mainly during fasting periods, the organization of events (in places with large concentration of people), the participation at special events related to nutrition (e.g. World Nutrition Day, medical conferences), participation in branch exhibitions/ road shows abroad. Television/ radio advertising is mainly limited to fasting periods.

2.5.9. Financial projection

In 2017, the total production of aquaculture amounted to 125,772 tons worth 534.95 million euros, showing a marginal increase of 0.15% in terms of volume and a decrease of 1.27% in terms of production value compared to the previous year. Taken into account the value of the fish produced by the fish farms, the total value of all aquaculture activities in 2017 amounts to 624.56 million euros. Fish account for the largest share of total production (85% of volume and 99% of value) and are followed by mussels (12% of volume and only 1% of production value).

Fry and fish feed are the main costs, as regardless of the size and organization of an aquaculture company, they account for almost 70% of production costs. The remaining 30% is divided according to the size and organization of each company in labor costs, depreciation and other operating costs (Fig. 13).

Fish feed consists the main raw material used in the production process as it represents 57% -59% of production costs. Raw materials used in aquaculture are mainly fish feed and fish oils, cereals, vegetable proteins and oilseeds, which are mostly imported from South America, Northern Europe and Africa. In Greece, there are 8 producers of compound fish feed, 3 aquaculture companies that own or participate in fish feed companies, while there is also a company that is mainly active in the production of animal feed and owns aquaculture facilities.



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Production cost structure

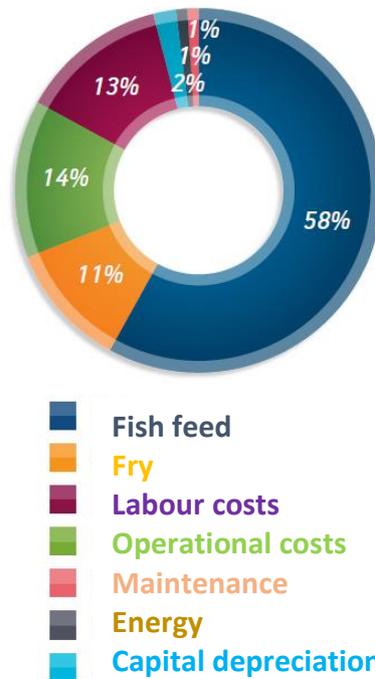


Figure 13. Production cost structure (ΣΕΘ, 2019)

In Greece, there are 29 marine fish hatcheries and in 2018 they produced about 446.8 million fish worth a total of 111 million euros, with the unit price ranging from 0.2 euros for sea bream to 0.4 euros for the meagre. Of these, almost 97% represents the production of sea bream and sea bass fry and 3% represents the production of fry for all other Mediterranean species (sharp snout seabream, pagrus, meagre). In 2019, it is estimated that the production of sea bream and sea bass fry will decrease by 2.08% and a total of 423 million fish will be produced. 245 million sea bream and 178 million sea bass fish will be produced, expecting a reduction of 2% and 2.2%, respectively, compared to 2018 (ΣΕΘ, 2019).

Since 2008, the industry has been facing an exogenous financial crisis in conditions of even more intense international competition and especially in conditions of suffocating liquidity due to the accumulated borrowing created by the previous crisis and the lack of access to borrowing money. This crisis is expected to lead to consolidation and even greater concentration of the industry (ΣΕΘ, 2015).

The industry's growth goal is inextricably linked to investment in research and innovation that will lead to new diversified products, improved production, packaging, distribution or consumption processes. These products must be even more competitive, i.e. of high nutritional value and low cost. The four main areas in which research must focus are:

- Improving the production process of existing species to reduce production costs.



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- Diversification - Breeding of new species in order to take into account the trends and needs of the modern market.
- Sustainable production of fish feed, aiming to utilize alternative sources of high-quality protein and lipids such as marine plants and microorganisms.
- Manufacturing – processing, development of more effective raw material processing technologies, advances in maintenance, and traceability of products (ΣΕΘ, 2015).

2.6. Proposals for the promotion of fishing in the Region of Eastern Macedonia and Thrace

Targeted actions in REMTH are proposed in order to promote fisheries, strengthen competitiveness of aquaculture companies, and develop the sector in the region. In this regard, the actions are aimed at ensuring the quality of aquaculture products, enhancing diversification, promotion, and competitiveness of businesses. The proposed actions aspire to strengthen the competitiveness of the industry, the exports of fish, the legalization of the movement of shellfish from neighboring countries in the Region, and increase the added value of fish produced (e.g. by selectively promoting certain products such as mullet roe). The afore mentioned actions will in turn increase production and reduce production costs for businesses.

2.6.1. Promotion of a regional brand name for aquaculture

Like every product, each Region has its own identity. However, in the context of international competition to attract economic activity, a Region should acquire a distinct, attractive identity. This can be achieved by creating a peripheral brand name for aquaculture, the so-called place branding or regional brand name.

Each Region as a non-tangible, diverse and complex "product" is difficult to assess. Therefore, it is necessary to implement a brand name policy in order for aquaculture in the Region of Eastern Macedonia and Thrace:

- to become "visible" to target groups, identifiable recognizable and distinct from other Regions,
- to be presented as a "quality product",
- to convince target groups that it meets their requirements,
- to build a positive image, trust and respect.

The brand name of an area is crucial for promotion to target groups. It is important to identify with the area, to make a positive impression and to be imprinted in memory. It can be verbal, visual, or a combination. The distribution of the regional brand name can be done through souvenirs, stickers, videos, DVDs, Internet, leaflets, hotels, clothes, etc. It can be an umbrella brand name or a group brand name.

2.6.2. Promotion of the Region

Promotion of the Region's fish can be displayed with all modern means such as by participating in specialized exhibitions, by creating special investment guides, by sending delegations, by connecting chambers, by special conferences and workshops, by more straight forward means such as contact



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with specific groups or companies of potential investors, etc. In modern times the cheapest and most direct means of promotion is the internet.

Creating a website and at the same time an electronic tool for attracting demand is a practice followed by many countries and regions in Europe.

The main purpose of the website will be to provide with accuracy, speed, attractiveness and reliability, data that will arouse the initial interest of prospective fishermen buyers from the Region of Eastern Macedonia and Thrace. The fragmentation of information and its lack in some cases requires the implementation of a comprehensive gateway for the Region's fish, which will be the starting point for product search routes from the region. It should have a spatial and thematic division and a hierarchical structure in order to ensure the valid information for the supply of fish from the Region.

The portal can be extended mainly to demand attraction issues. However, in order to achieve this, it will have to use all available scattered information at a regional level in order to search for information based on organizations, agencies and businesses.

2.6.3. General organization

Regions mainly offer services (e.g. information, advice, funding, tourism and cultural offers) and for this reason marketing is similar to marketing of services. Regional actors belong to the field of economics (e.g. chambers, businesses, hotels, traders, transporters), administration (regional self-government and administration, municipalities), media, science and research (e.g. universities and technical institutes, institutes), culture (e.g. museums, theaters) and leisure (e.g. sports), as well as citizens as consumers and producers of services.

For the creation and promotion of a regional marketing plan, it is required to create a regional network with the participation of all regional actors (e.g. Region, regional association of municipalities, public administration, associations and Chambers, universities, citizens), for the creation of a virtual regional enterprise aimed at creating the profile and attractiveness of the area. In particular, the promotion of REMTH fish and the support of competitiveness and entrepreneurship, require the creation of an institution capable of guiding, specializing and envisioning development strategies, adapted to local conditions and effective in the international economic system.

Therefore, it is proposed to establish a Regional Marketing Forum with the participation of representatives of regional and local government, business associations, businesses and civil society. The Forum will be responsible for drafting an overall regional marketing plan, which will include the analysis and configuration of the "product", the selection of the strategy and the means of promotion as well as its evaluation. The Forum will be invited to help create a competitive environment that will accelerate the networking of businesses with consumers.

2.7. Conclusions

The marketing strategy of the aquaculture sector in Greece takes into account that prices of products are stable and therefore there is no intense competition, the increase of exports to European Union countries, merging of companies that have taken place in the sector so far, companies do not use advertising to a large extent, several large companies are certified according to ISO/ HACCP/ AGRO 1-



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2/ AGRO 4-2, and the growing consumption of fish in Europe and Greece. Large companies in the industry use slogans in order to communicate their Unique Selling Proposition either through the home page of its website or in the packaging they use. The largest companies in the sector have organized distribution networks through subsidiaries that promote them mainly abroad. In addition, these companies also sell fish on behalf of smaller companies in the industry that do not have their own distribution network. Fish markets and fishmongers are the most important network of aquaculture in retail.

There are coordinated efforts to develop a national brand name, which connects the quality aspects of seafood with their origin. As the creation of a global brand is complex, aquaculture companies plan to set up a producer organization that focuses specifically on promoting already established markets and exploring new opportunities for expanding distribution channels and market destinations. It is proposed to promote a Regional brand name for REMTH fish, the promotion of the Region and the organization of the bodies of the area for the creation and successful implementation of a complete marketing plan of fish. Greek aquaculture produces fish according to EU guidelines and standards for environmental protection, health and well-being and consumer protection, which add to the collective costs of their products.

3. ROMANIA

3.1. Characteristics, Structure and Resources of the sector

The inland waters of Romania represent 3 percent of the total surface of the country. There are 400.000 ha of natural lakes and ponds, manmade reservoirs, including the Danube Delta; 84 500 ha of fish farms; 15.000 ha of fish nursery areas; 66.000 km of rivers of which 18.200 km are in the mountain area; 1.075 km are located in the lower part of the Danube. At the same time, Romania has a 250 km coastline along the Black Sea, while the exclusive economic zone covers 25.000 km². Currently, over 70.000 ha are used in Romania as fish ponds and represent a great advantage for the development of aquaculture in the Country.

The fisheries sector includes aquaculture, marine and inland fishing activities, Romania's main fishery production component is represented by aquaculture, followed by the inland fisheries. The fisheries activities along the coastline of the Black Sea remain limited compared to inland fisheries.

According to the Aquaculture Units Registry (ARU), 518 units are registered in the aquaculture sector, which own 575 aquaculture farms (ponds, lakes, etc.). The 518 registered units are divided into: 19 nurseries (holding only a nursery license); 324 hatcheries (holding only a hatchery license); 175 nurseries and hatcheries (holding both nursery and hatchery license).

In Romania, the aquaculture activity consists mainly in freshwater crops, and the country's land resources and availability of inland waters provide excellent conditions for fish farming. In 2017, they were used the following main production methods: 82% of production: in fish ponds; 16% of production: in basins and canals; 2% of production: in floating cages. The most important cultured fish species are members of the cyprinids, particularly common carp, followed by trout, zander and pike. In 2017 the aquaculture sector produced 12.209 tons of fish.



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Within the aquaculture sector, the predominant activity is freshwater fish farming, while the cultivation of other freshwater aquatic organisms (crayfish, mussels, aquatic plants) or marine water is practically non-existent. Freshwater fish farming practiced in Romania is characterized from a technological point of view by two directions: intensive growth (especially salmonids) and extensive and semi-intensive growth of cyprinids in polyculture, in land basins (ponds, ponds and lakes).

Traditional cypriniculture in land basins is compatible with sensitive habitats and provides environmental benefits and services. In many of the NATURA 2000 sites in Romania, fish farming activities are carried out, these being fully compatible with the conservation of the natural values of the sites, the most eloquent proof being the very designation of the fish management area as a NATURA 2000 site. Extensive fish farms have become multifunctional farms where other social and environmental services are provided: recreation, maintaining biodiversity and improving water management.

3.2. Specific characteristics at the national level

The Romanian aquaculture sector produces mainly cyprinids, both of indigenous origin (carp, crucian carp) and of Asian origin (silver carp) that represents more than 75 percent of the total production. Until 2005, cyprinids dominated this industry, representing 85% of the total production, the remaining 15% being represented by trout, perch, pike, perch, catfish, sturgeon, etc. After the cyprinids, the second species produced is trout sharing 9%. In the following years this structure of the species has been largely preserved, still, there is a slight increasing towards cyprinids.

Even though sturgeons are not mentioned in this statistic, the caviar farms are currently starting out to develop and the population quotas of the Danube are given in different statistics. All reared species are freshwater species; marine aquaculture in Romania is at its initial stages, in spite of the 250 km long marine coast.

In 2016 there were registered 31 fish processing companies, and in 2017, 20.170 tons were produced of which prepared and frozen whole marine fish were the main product. Still, the Romanian market has a diversity of fishery products: live fish, full fish (fresh, refrigerated or frozen); primary processed fish (eviscerated, beheaded, filleted, cut); semi-prepared (marinated, pasted, fish roe, salted, smoked fish); canned fish (in oil, in tomato sauce, other types).

3.3. Management and promotion of the aquaculture sector

3.3.1. The Institutional Framework

In Romania National Agency for Fishing and Aquaculture (NAFA) has the responsibility for the design and for the development and implementation of the fisheries policy, which is a public institution entirely financed from the state budget. NAFA is the agency that draws-up the strategy and the legal framework for fisheries in Romania. And it is also responsible for the technical implementation of measures and for the control of regulations and activities in fisheries and aquaculture.

The proposal for the reform of the Common Fisheries Policy (CFP) aims to promote aquaculture through an open method of coordination: a voluntary cooperation process based on strategic guidelines and multi-annual national strategic plans that identify common objectives and, where possible, indicators to measure progress in this direction.



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3.3.2. The Governing Regulations

The Law no. 192/2001 regulates the conservation, management and exploitation of living aquatic resources, aquaculture activity, as well as the processing and marketing of products obtained from fishing and aquaculture. Some of the objectives of this law are: pursuing a sustainable exploitation of living aquatic resources in natural fish basins, promoting sustainable development and taking the necessary measures to conserve and regenerate these aquatic resources and ecosystems; development of aquaculture sector; stimulating a responsible trade, which contributes to the conservation of living aquatic resources;

Order no. 171/2002 approves the norms for the marketing of fish and other aquatic animals, provided in the annex that is an integral part of this order.

3.3.3. Applied Research, Education and Training

The National Agency for Fishing and Aquaculture collaborates with research institutions in the field to meet the objectives set by the strategy and requires studies for the knowledge of the biology, ethology and structure diversity, functionality and productivity of aquatic ecosystems and their specific interactions. Some of the government aquaculture research institutions are: Institute of Research and Development for Aquatic Ecology, Fishing and Aquaculture, Galati, Romania; Fish Culture Research Center - Nucet, Dâmbovița County; National Institute for Environmental Protection, through the sub-units: National Institute for Marine Research and Development “Grigore Antipa” Constanța and National Institute for Research and Development “Danube Delta” Tulcea.

The Department of Fisheries and Aquaculture of the “Dunărea de Jos” University of Galati is the oldest and the most important provider of higher education and training in aquaculture and fisheries. At the same time, each of the domestic agricultural universities offers in their *curricula* training in fish breeding for day or regular students, but with varied emphasis and subject matter.

Training in aquaculture at undergraduate level is offered by the National Agency for Agriculture Consultancy, which is under the direct coordination of the Ministry of Agriculture and Rural Development. In addition, in Romania there are some training centers authorized to develop training courses for workers in aquaculture (especially for fish culture). In spite of the strong research sector, there is a gap between the sectors of education/training and the SMEs in terms of applicability of the results achieved by the education and research sectors in direct correlation with the SMEs needs.

3.4. Market research

Romania produces large quantities of carp, so it is naturally that on the Romanian market we find that the most fingerlings produced are those of cyprinids. In the country there are fish farms that are selling fingerlings, and many of these farms advertise on their website or buying-selling sites. Romania imported, in the period January -September 2017 a quantity of 56.021 tons of fish, crustacea and jellyfish, an increased value of 5.4% from 2016 – same period. The export values for the fish, registered in the same period are 20 times lower.



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3.4.1. Street markets (legal standards on EU or national level)

Government Decision no. 348 of March 18, 2004 establishes the general rules for the exercise of specific forms of retail trade and the provision of services in some public areas, as well as the minimum equipment requirements necessary to carry out these activities. Retail in some public areas means the activity of marketing products and services, carried out permanently or seasonally in markets, fairs, public passages, public roads and streets or in any other area intended for public use, except those specially administered.

The purpose of regulating trade in public areas is to create a framework for the marketing of market products and services, which respects the principles of fair competition, protection of life, health, security and economic interests of consumers and the environment. Public areas may be managed directly by the local public administration or by private contractors under the conditions provided by law.

In public areas it can carry out its activity: any legal person engaged in the activity of retail sale of products; individual agricultural producers and their associations, which market their own agricultural and products.

3.4.2. Selling live or processed fish to restaurants

The Romanian market is supplied with fish coming from marine fishing, freshwater fisheries (catch or aquaculture) and from imports. The Romanian market offers the following forms of fishery products: live fish, full fish (fresh, refrigerated or frozen), primary processed fish (eviscerated, beheaded, filleted, cut), semi-prepared (marinated, pasted, fish roe, salted, smoked fish), canned fish (in oil, in tomato sauce, other types).

Still, the majority of restaurants from Romania use imported fish. But there are also businesses that have the of multifunctional fish farming. This involves the realization of the entire commercial chain: production of raw materials (fish farms) – production of finished products (fish processing section) – marketing and distribution of finished products (restaurant, own stores, traditional distribution networks).

Producer organizations are set up by fishermen or aqua culturists who associate freely for the purpose of implementing measures to ensure the best conditions for the marketing of their products. These measures aim to: encourage production planning and adaptation to demand, in particular through the implementation of catch plans; to promote the concentration of supply; to stabilize prices; encourage methods that promote sustainable fishing.

In order to help the restaurant and producers, the Tulcea Fish Exchange was created. It is an investment objective financed from the European Fisheries Fund. This investment comes in support of commercial fishermen, and has the role of facilitating the activity of fish collection centers and aquaculture farms in the Danube Delta on the distribution/sale segment, on safe marketing chains and as short as possible. The main purpose of the Fish Exchange is to strengthen the infrastructure for collecting and distributing fish caught or produced in aquaculture farms in the Danube Delta. The Romanian commercial provisions of fish are strangely coming from fish markets from Greece and Bulgaria and not from Danube Delta or Constanta County. The only operational fish stock in Romania



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is located in Tulcea (was reopened in 2019) but it is not used at the full capacity. Therefore, an amount of over 350 M.euro/year is spent by the Romanian commercial in their commercial relations with fish stocks from Greece and Bulgaria. Over 80% from the restaurants that are operational at the Black Sea area from Romania, are offering the fish dishes on regular bases. But the offer is covering fish from the Mediterranean Sea and not from the Black Sea. The reason is that the local fisheries are not equipped to offer a constant production flux. The owners of both restaurants and fish pond, have the opportunity to personalize their menu in direct correlation with the daily “pray”.

3.4.3. Groceries or live for pond stocking

The majority of fish products are distributed and sold through supermarket chains. Romanian’s household consumption is dominated by live/fresh fish, followed by frozen fish, and marinated and prepared products.

3.4.4. Food-size sport fish or ornamental fish using the following structure

Order no. 15/2011 regarding the conditions for recreational/sport fishing, the regulation for recreational/sport fishing, as well as the models of recreational/sport fishing permits. The attribution of the right of recreational/sport fishing is made by the administrators of the living aquatic resource, in all the natural fish habitats, in accordance with the law.

Recreational/sport fishing in natural fish habitats is based on permits issued by the administrator of living aquatic resources and issued by him or by sport fishermen's associations, as appropriate. Within the Ministry of Agriculture and Rural Development, through NAFA, operates the unique Register of records of sport fishermen's associations, legally constituted non-profit legal entities, as well as national representation forums, established on the principle of free association.

The association is ensuring fisheries management in the fishing areas that they have in custody and managing protected natural areas. Some of the fishing farm delivers to fish for sports fisheries after reaching a weight of two kilograms. At the same time there are also fish farms that offers arranged places for sport fishing, stating in their offer the kilograms and species of the fish.

3.4.5. Live and processed fish markets

In Romania we find many live and processed fish markets, still we encounter the same problem as restaurants, a large portion of the fish from the market comes from the import. Only in recent years a small number of Romanian companies have begun to offer competitive products from local production (especially semi-finished products). Most of the raw material is imported. Mackerel and herring are the species that have a share in both imports and processing. Most of the total imports are represented by the import of frozen fish, in various forms of presentation.

3.4.6. Price formation

Emergency Ordinance 23/2008 on fishing and aquaculture states the the first sale represents sale which is made for the first time on the national territory and which establishes by documents the price of the product. The first price of fishery products is made in places established and authorized by the Ministry of Agriculture, Forests and Rural Development, at the proposal of the National Agency for Fisheries and Aquaculture.



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Authorized persons and/or legal persons having production capacity for commercial fishing or aquaculture may, on their own initiative, set up producer organizations for the purpose of responsible fishing and improving the conditions for the sale of products made by their members. The members of the organizations must sell the product or products for which they are associated, in compliance with the legal provisions in force, in order to improve the quality of products, adapt the volume of supply to market requirements and improve the marketing process.

3.4.7. Market controls

The fish products may be sold or marketed only if they meet marketing standards for classification by quality, size or weight, packaging, presentation, and labeling. In Romania the National Authority for Consumer Protection is responsible for checking the quality, marketing and labeling of fish, prepackaged fish dishes and canned fish, while NAFA control the fish farms, the quality of the fish.

3.4.8. Cold chain

There are firms in Romania that specialized in this type of distribution, but the sector is still under development.

3.5. Marketing strategy

3.5.1. Product - variety, quality, design, features, brand name, packaging, services

As mentioned above, the majority of fish that Romania produces are cyprinids. The main cultured species in Romania are common carp, silver carp, bighead carp, grass carp, goldfish, rainbow trout, crucian carp and sea trout. These species account for 90 percent of the total production. In addition, northern pike, catfish and, more recently beluga and sturgeons are also reared. Currently, marine aquaculture in Romania is at its initial stages, a single mussel farm being registered farming Mediterranean mussel, despite the fact that certain studies suggest that there is interest and there are possibilities for developing this sub-sector.

The aim of the current aquaculture businesses is to ensure a higher level of quality of local products and services related to fishing and aquaculture. Belonging to the local standard will provide the consumer with a guarantee of the quality of the products and will provide information about their geographical origin. In this way it contributes to the development of local fishing brands. As mentioned above, the farm uses also offer different services, like sport fishing, for recreational purposes.

3.5.2. Price - list price, discounts, incentives, payment period, credit terms

The price reflects the quality of the product, and for the farm fish to prosper and profit, it must not be too low or too high. Many producers have a set price when they announce their offer, but the price is negotiable depending on the quantity the buyer wants. For carp the prices varies between 11-12 RON per kilogram, and the prices for trout are around 20 RON per kilogram. There is a financial instrument that are fostering support instruments for the Romanian fishery sector – the Operational Program for Fishery and maritime Affairs 2021-2027, the final version being adopted by the EC on 14.04.2020, the goal being the promotion of the sustainable fishery in regards of the environmental



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protection and efficiency of the resources used, innovation and competitiveness based on knowledge.

The facilities for both the Non-governmental and SMEs sectors that are active in the aquaculture areas are focused on:

- Modernization of the commercial fishery infrastructure: harbor and landing areas for fishery farms, setting up and modernization of the fishery area inland water
- Enabling the fishery products increasing value in different stages: processing, commercial and selling (supporting the short supply chain from the fishermen to clients).
- Supporting innovation in the fishery area throughout the improvement of the operator's performance (creating the premises of building a constant flux of product both for the processors and restaurants owners)
- Supporting the breeding process (interventions regarding the diversification of the production in different stages)
- Supporting initiatives from building networks and partnerships between the aquaculture stakeholders, hence creating the premises for a sustainable approach of the sector.

3.5.3. Place - channels, coverage, assortments, locations, inventory, transportation, logistics

Fish is an easily perishable product, and its preservation in food safety parameters from the time it is caught to the time of consumption or processing depends essentially on the time and conditions of transport. Also, the preservation of fish and fish products in good condition depends on the conditions of temporary storage within the marketing units.

So the aim is to give the buyer the product as fast as possible, to distribute it to the local shops or directly to the buyer.

3.5.4. Promotion - advertising, personal selling, sales promotion, public relations

The promotion for the products is made through every channel of advertisements and promotional activities carried out by the manufacturer to create demand for the product. The fish producer are advertising their products on social media pages, on their website or buying selling sites.

As mentioned above there are also association that helps the producer to sell and buy the products offered. According to the art 78 (1) (b) from the CE Regulation no 508/2014 regarding the European Fund or Fishery and Maritime Affairs, every state will set up its national network that will comprise different actors from the aquaculture sector. The main objective of the network will be to support the Local Action Groups from the aquaculture area (FLAGs) in their effort to contribute to the sustainable development of the fishery areas that area included in the Local development strategies, that are previously approved by the Management Authority of the Operational Program for Fishery and Maritime Affairs 2014-2020. Within the activity of the network are included and financed throughout the program promotion activities for the network participants individual or as an interest group (for example a fish category that are bread or commercialized by more then 1 SMEs of NGO).



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The network is open for registration under the condition of meeting a set of conditions and the operational costs are usually financed by the program. The Romanian network (www.ampeste.ro) is also part of the European Network – FARNET <https://webgate.ec.europa.eu/farnet>

3.6. Marketing plan

3.6.1. Executive summary – resources existent (human, material so)

Fishing and aquaculture, along with fish processing and trade in fish and fish products, are activities present in all regions of the country. In some isolated areas, such as the Danube Delta and Meadow, fishing is one of the main activities, which provides jobs and sources of income for the local population.

Currently, the patrimony of fishery interest of Romania, consisting of surfaces permanently or temporarily covered with water, is estimated to have an area of almost 500.000 ha of stagnant water, 66.000 km of running water from the mountain, hilly and lowland area and 25.000 km of water from the Black Sea. The water surfaces in the public domain are represented by: 300.000 ha of natural lakes and ponds, 98.000 ha of accumulation and polder lakes, 47.000 km of rivers in the hilly and lowland area, 19.000 km of rivers in the mountain area, 1.075 km of the Danube river.

In February 2020 the unemployment rate was 3.9%, so by developing this sector we can create more jobs, helping the growth of the country's economy. In 2005, 2.781 people were employed in the aquaculture sector, representing over 40% of the total man power in the fisheries sector. The full time employees were 2.333, while 448 were part-time or occasionally recruited. People between 40-60 years of age were 601 (21.61 percent), 2 161 people were between 20-40 years of age (77.71 percent) and 19 people under 20 years of age (0.68 percent) were employed in aquaculture activities. Concerning the training level of people involved in the fisheries sector, the situation is as follows: higher education employees represent the 14.71 percent of the total, high school education employees 41.21 percent and elementary education employees, namely workers, 44.08 percent.

From a financial point of view, the European Union, through Operational Programmed for Fishing or European Maritime and Fisheries Fund offers financial opportunities to develop or modernize an aquaculture business. The fund also helps fishermen in the transition to sustainable fishing, supports coastal communities in diversifying their economies, finances projects that create new jobs and improve quality of life along European coasts, supports sustainable aquaculture developments.

3.6.2. Target consumers

In the future there are signs of increased consumption of fish that will obviously affect the consumption of specialties. In recent years, a trend has emerged in terms of proper diet, and it is based on the appreciated fish meat because it improves the quality of life, reduces aging and helps maintain the figure.

Romanian consumers traditionally prefer meat products and the consumption of fisheries and aquaculture products is far below the EU average. However, the national average apparent consumption of fish and seafood has followed an upwards trend in recent years, reaching 6.2 kg per capita in 2015.



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By creating a sustainable marketing plan, not only we meet meets the customer's requirements, we also attract new customers through the products offered by offering valuable and quality local products. So we can offer our customers local fresh fish. One of the preferred species are crap, and our hatcheries produces large quantity of cyprinids.

The appearance of imported species on the Romanian market has determined a diversification of the offer and a change of consumers' preference towards new fish species and forms of presentation (live, filleted, and portioned) as well as a demand for fish and fish products in increase until 2007.

The producers can also export fish, the Czech Republic is the largest producer and Poland the largest consumer, while Hungary has the highest consumption of carp per capita, with carp being the most consumed fish species in Hungary.

Romania produced in 2013, according to FAO data, over 3.500 tons of carp. However, Romania did not export any carp during this period, the entire production being used for domestic consumption. Also, we cannot forget about the export, our country export, in 2017, Romania exported 24.428 tons, (including 17 822 tons of fishmeal) of fisheries and aquaculture products worth €40 million. The ratio for import/export in Romania is 1:20.

3.6.3. Selling strategy – the concept of unique selling proposition- USP (how are we different from our competition)

Around 1440 products are listed in the register of protected designations of origin and Protected Geographical Indications (PGI) of the European Union, and Romania has seven products registered, witch 2 of them are fish, smoked mackerel from Romania's Danube, smoked bighead carp, from Țara Bârsei.

PGI emphasizes the relationship between the specific geographic region and the name of the product, where a particular quality, reputation or other characteristic is essentially attributable to its geographical origin. It can apply to food, agricultural products and wines.

From this date we see that Romania has unique products and it also shows our potential to deliver quality products. The producers communicate with the consumers, for example social media to explain how are the fishes raised, what kind of they eat, if it is ecological or not. There is not yet a consolidated strategy approach regarding the selling of the local fish, although in the Romanian network there are efforts in this regard.

3.6.4. Pricing and positioning strategy (position on the market in direct correlation with the price offer)

As mentioned above, the price reflects the quality of the product, and for the farm fish to prosper and profit, it must not be too low or too high. The price is competitive (market-oriented), meaning that means that e-commerce retailers set their prices according to those of competition and market trends, not according to customer demand or costs. Still the price also fluctuates when there is an economic crisis. Although there are differences regarding the supply chain (the fluctuance and the inconsistence registered at the level of Romanian producers), the prices are comparable (Romania, Greece and Bulgaria).



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3.6.5. Distribution plan

The costumers have to possibility to buy directly from the producers through the ads placed by the producers on different sites. The means of transport is established between the two parties. Many of these advertisement offers free transport, other offers free transport if a certain quantity is purchased. The supply chain is unstable. Therefore, the distribution plan is usually daily generated. There are all in business (producing and delivering) that are including their own fishing pound, this being the solution adopted for providing a constant offer to the consumers.

3.6.6. Offers building

The offers include the fish species and the kilograms for different uses, fish for consumption or for sport fishing. These offers also include the possibility of free transport to attract the costumers.

The offers for sport fishing often include the pictures of fishes, showing the potential costumers what they can capture, inviting all people, of all ages to participate in this sport. Often, the offers are discussed and negotiated directly with the supermarkets – as final sellers.

3.6.7. Marketing materials

For the marketing materials there are needed catalogues or flyers.

3.6.8. Promotions strategies (online promotion, offline promotion, TV, specific events etc.)

A significant part of the promotion is made online, on the social media platform, association sites or profile sites. They also communicate with their customers through social media platforms, they show photographs of their product to attract the costumers, or show the fishes that are for sport fishing, the kilogram of fishes differs depending on what they are used for.

3.6.9. Financial projection

From 2013 to 2012, total income decreased by 16%, while the operational cost decreased by 15%. The total income is dominated by the turnover from the sale of fish from the farms, which contributes 65% of total income, leaving only 33% to other income and only 2% for subsidies. In 2017, Romania exported 24.428 tons, (including 17.822 tons of fishmeal) of fisheries and aquaculture products worth €40 million.

Having this date, we expect that this sector will grow and develop by attracting different forms of financing.

3.7. Marketing strategies

The present situation, pandemic COVID 19, created a supplementary pressure on the aquaculture field. The Romanian POPAM amended its support with a enabled a set of mitigation measures for the pandemic situation, that included the following:

- compensation amounts for the fishermen – temporary suspension of the commercial fishery in the period 01.02.2020-31.12.2020



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- compensation amounts for the aquaculture representatives in the case of temporary suspension of the production and selling activities or additional costs correlated with the pandemic situation, for the period 01.02.2020-31.12.2020
- compensation amounts for the processors in the case of temporary reduction of production and selling in the case of supplementary costs regarding the production storage correlated with the pandemic situation, for the period 01.02.2020-31.12.2020.

The measured above mentioned are tackling the financial challenges faced by the sector, in the same time enabling the possibility of accessing the support in a strategic manner, enforcing the existent networks and its efforts of increasing its presence on the Romanian consumption market. There is a compulsory need for an integrated approach in terms of developing the marketing strategy at the national level, that are tackling the specificity of both industrial and domestic production in direct correlation with the national consumption.

4. TURKEY

Turkey is very big country by its area, length of the coasts, fishery production provided four seas and rich inland waters, and aquaculture production carried out both in marine, brackish and inland waters. Therefore there should be intelligent marketing strategies to increase revenues of the fishers and farmers as well as supply healthy fish and fish products to the consumers with considerable prices.

4.1. Characteristics and structure of the sector

4.1.1. State of aquaculture production

Aquaculture has rather short historical background in Turkey comparing with other countries. It started with eel culture in 1960's in the western part of Turkey (Aegean Region). Then rainbow trout culture has started in 1970's and spread all over the country. The capacities were kept small at the beginning due to high costs of feed, energy and staff which cause expensive market value comparing with the fish captured from the sea and the inland waters. Therefore farmers having small capacities used to run small restaurants to market their production by adding value, and used to find good prices when the fishing season closed from April to September. Another common belief was the "artificiality" of the fish which all requirements need to be covered by unnatural ways. The most successful farms operators were the ones who feed fish with poultry and butcher wastes as wet meal which create skin colour as same as the fish in wild environment, energetic and good meat quality. Such products could be able to have good prices in the farm and market. During these periods and even now, consumers have preferred to eat wild fish for its price, natural taste and abundant supply. When catch and landings started to decrease due to unfavourable conditions (pollution, invasive species, climate change, overfishing, etc) affecting fish stocks, farm produced fish became attractive due to its continuous supply, species and product diversity, and high export potential.



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4.1.2. Specific characteristics

Despite of the stagnation in capture fisheries production, farmed products is increasing in Turkey. Total number of fish farms in Turkey is 2100 with the total capacity 486786 tons per year. Number of farms producing marine fish species are 426 with the capacity of 254430 tons while there are 1860 farms in inland waters with the total annual capacity of 232356 tons (BSGM, 2018). According to the 2018 data, total aquaculture production is 314537 tons of which 209370 tons from marine and 105167 tons from inland aquaculture.

Total of 29586 tons were produced in the Black Sea (9.41%); of which 13257 tons in marine and 11018 tons in inland farms.

There are 20 marine fish hatcheries with an annual capacity of 815 million juveniles and 55 inland water hatcheries with a capacity of 541 million juveniles in Turkey. According to the records of the General Directorate of Fisheries and Aquaculture (GDFA), 5 of the 20 marine fish hatcheries run by private sector and produce only sea bream and/or sea bass. Other marine hatcheries produce fish species such as meagre (*Argyrosomus regius*), common dentex (*Dentex dentex*), turbot (*Psetta maxima*), red porgy (*Pagrus pagrus*), sharpnose seabream (*Diplodus puntazzo*), brown meagre (*Sciaena umbra*), shi drum (*Umbrina cirrosa*), pink dentex (*Dentex gibbosus*), Red banded sea bream (*Pagrus auriga*), sand steenbras (*Lithognathus mormyrus*), red porgy (*Pagellus acerne*), horse mackerel (*Trachurus trachurus*), grey mullet (*Mugil cephalus*) (BSGM, 2018).

Aquaculture is one of the main social and economic drivers in the Black Sea due to lack of industry, employment and commerce possibilities. Rivers discharging to the Black Sea and spring waters encouraged local citizens to be interested in trout farming since 1960's. Due to climate and topography of the region, entrepreneurs started trout farming even in small capacities up to 5 tons per year. Rivers born from highlands host endemic brown trout (*Salmo trutta*) and sea trout (*Salmo labrax*), which are popular in the region. When aquaculture develops in other regions of Turkey, the share of the Black Sea started to decrease due to small capacities and lower production even the number of farms higher.

In 2000, the share of the aquaculture production was 15% and gradually decreased to 9% though the improvement of the aquaculture by cage culture in dams and sea. There is a higher increase in the production of farmed species all over the country.

Trabzon is one of the most important provinces by means of total aquaculture production as 5541 tons of which 5155 tons comes from marine and 386 tons from inland farms. With such marine production, Trabzon is the top producer in the Black Sea. Production capacities in marine and dam cages is continuously increasing by extension of the current farm capacities and allocation of new farming sites for entrepreneurs in 2020 and 2021 onwards.

According to the data of The MoAF, the production from aquaculture in Trabzon has increased 8.5% in Trabzon (9538 tons in 2014; 10352 tons in 2019), 96% in Ordu (1591 tons in 2014; 3115 tons in



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2009), 3579% in Sinop (42 tons in 2014; 1545 tons in 2019). Aquaculture production has reduced 51% in Samsun city from 5741 tons in 2014 to 2830 tons in 2019. As in the region, total production in Turkey has increased 59% from 2014 to 2019, 235133 tons and 373356 tons, respectively.

This volume of production requires good strategies for marketing on these fields:

- Sufficient egg and juvenile supply in time,
- Supply of feed in good quality for each growth cycle of fish
- Fish transportation capacities form farm to farm
- Qualified staff working each of the production cycles
- Marketing of fish in different production steps (egg, fry, fingerlings, portion size, adult, big sized fish)
- Sufficient processing, freezing and cold storage,
- Looking for new international markets to export
- Advertising and promotion

One of the main problems of the industry is the juvenile supply. In case of sea bass and sea bream, companies have their own hatcheries to cover their needs. Some part is also exported. Trout culture has very serious lack of sufficient juvenile supply. Big companies are obliged to import eggs in order to overcome this problem. It is one of the new markets in the region to deliver these eggs to the hatcheries contracted. Until reaching the size of transfer, nursery and on growing period are completed in those hatcheries under their responsibility.

There is no problem to supply fish feed. There are many companies produce fish feed for various growth stages as well as imports. Some of them are not in good quality due to insufficient fish meal ingredient; some others are very expensive which creates high costs to the farmers. But any case there is no supply problem in the market.

There is fish transportation vehicles commonly used in all farms to transfer fish to/from farms when and where is needed. It is very easy to upload and download fish to trucks and their new environment.

Specification of all these processes needs qualified staffs which are obtained from the graduates of Faculties of Fisheries (Istanbul, Rize, Sinop), Faculty of Marine Sciences- Department of Fisheries Technology (Trabzon, and Ordu), plus from the other universities having fisheries education in other cities. Divers are another group of qualified staff needed at many stages of culture in cage farming. Universities and diving schools are in charge of their trainings.

There are also sufficient fish processing, cold storage and freezing plants in the region which are essential in marketing. Local demands are covered directly from the farms for fresh consumption. After June trout are all harvested from the cages in sea due reduced oxygen levels. Farms in dams in high elevations and small farms located nearby rivers fed by stream waters may continue keeping trout in all season and market fresh.



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4.2. Market research

Marketing is the final but the most important step to reach targeted levels for the aquaculture business investments to make fastest turnovers and provide sustainability for the company.

Literally, marketing strategy is a part of any business plan that outlines any overall advertising plan on how to find and attract customers or customers with the business. Marketing strategy focuses on what it is desired to achieve for the business and marketing efforts. As a following step, a marketing plan is needed to explain how a company will achieve these goals.

The main deficiencies are these two concepts on marketing of fish and fish products of Turkey. Obviously there are rather minor problems in internal marketing. Producer-wholesaler-retailer links are well established and packing, processing, cold chain, transportation to other markets provided efficiently. There are rules regulating markets and sanitary issues, standards, etc.

The most important problem is not to be a brand name in international markets. At present majority of fish and fish products exported as raw material to be sold under buyer's brand in European and Asian markets though exporter companies and deliver the products with cold chain.

4.2.1. Juvenile supply

As far as aquaculture production has increased, the demand for juveniles has also increased. At present, there are no sufficient hatchery capacities for trout farming in the region and Turkey. Therefore there is great competition to provide juveniles from hatcheries in different locations of Turkey which let high costs of the final product. This is the common problem for rainbow trout ranching in net cages established in dam reservoirs and sea. In case of Black Sea salmon "Salmo labrax" and sea bass, there is no problem for juvenile supply. After transferring juveniles from their origin by trucks inside the aerated tanks, they reached their final destination with 2-3% mortality for further growth and fattening.

During this competitive period, preliminary agreements from company to company by paying certain level of advance could be sufficient. The more early agreement provides priority for the allocation and delivery of the juveniles from producers. Buyer is responsible for the delivery.

Information about 6 hatcheries marketing juveniles are given below:

<p>FIRAT ALBALIK (2 hatcheries) 1-20 g juveniles Saha Mahallesi Halfeti Yolu Üzeri 5.Km Birecik Şanlıurfa/ TÜRKİYE Phone: +90 414 652 38 41_ -Gürçay Köyü Mevki Birecik Karkamış 19.km de Karkamış \Gaziantep e mail: info@firatbalik.com.tr, ala_firat@hotmail.com GERMANY BRANCH: HC Fırat Gıda GmbH, Alfred Nobel-Str. 22 59423 Unna http://www.euphrat-food.de/Startseite/ Phone: 02303/98 323 20 Fax: 02303/98 323 21 E-mail: info@euphrat-food.de</p>	<p>AKDERE LTD Juvenile capacity: 2 mil/year -Akdere Fish Farm, Akdere Köyü, Gürün / Sivas -Hurman Kalesi Premises: Hurman Kalesi Yanı, Dağlıca - Afşin / Kahramanmaraş Tel: 0346 734 10 13, Fax: 0346 734 11 12 GSM: 0532 413 36 56 Email: akderealabalik@gmail.com Skype: hamit.akdere, Twitter: akderealabalik http://www.akdereltd.com/index.html</p>
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HC Euphrat Food GmbH Dürerstraße 3 95129 Schwarzenbach an der Saale http://firatbalik.com.tr/	
YILMAZ ALABALIK Juvenile capacity: 10 mil/year Işıtan Mahallesi AG Mevkii Gürün / SİVAS info@yilmazalabalik.com Phone: +90 (346) 715 10 07 Necdet Yılmaz: +90 (532) 515 02 81 Tolga Yılmaz: +90 (505) 702 05 87 http://yilmazalabalik.com/	ÖNDER ALABALIK Babataşı Mh. Muhammer Aksoy Blv. No:2 Fethiye - MUĞLA Phone: +90 252 - 614 69 49 Fax: +90 252 612 72 32 E mail: info@onderalabalik.com.tr http://www.onderalabalik.com.tr/contact_us.aspx
KEBAN ALABALIK A.Ş. 150 juveniles per year Çırçır Mevkii Keban/ ELAZIĞ Phone:+90 424 571 23 23 - +90 424 571 22 01 Fax: +90 571 32 70 Email: info@kebanalabalik.com.tr http://www.kebanalabalik.com.tr/	ÖZPEKLER SU ÜRÜNLERİ LTD. Bozburun Mahallesi A.Nazif Zorlu Sanayi Sitesi 7152 Sokak No.4 Merkezefendi / DENİZLİ Phone: +90 258 3722566 Fax: +90 258 3717421 https://www.ozpekler.com.tr/ozpekler/

There is no problem to find juveniles of *Salmo labrax* and Sea bass in the region due to pre-orders and availability on demand.

MoAF DG Wildlife has conducted a project to produce juveniles or brown trout for the enhancement of rivers that the adults taken from the same river. In the last 11 years, total of 11,491,500 juvenile trout have been released from Altındere Trout Breeding and Production Station in Maçka district of Trabzon to streams and lakes in different provinces of Turkey. In 2017, it was stated that 3,042,000 more natural trout fry released into the streams in 16 provinces, while the amount of juvenile trout released into streams and lakes in 12 years will reach 14 million 533 thousand 500 in total.

Regional Directorate of Nature Conservation and National Parks of the Ministry of Agriculture and Forestry has initiated the project "Natural Trout Breeding and Fishing of In-Forest Waters" in 2005 to increase destructed trout populations due to illegal and overfishing. Project aims to produce natural (red spotted) trout and additional 4 more subspecies to release in their natural habitats, to develop sportive fishing and support local people by social and economic aspects. There is no sale to the commercial producers. However station works like an inventory to keep adults and juveniles of trout species representing the natural sub-species of many regions of the country.

4.2.2. Street markets/ local fish shops/ wholesale markets

According to the latest statistics majority of the fishery products are marketed fresh across the country; especially the fish from capture fisheries. Fishing season in the Black Sea starts in mid-autumn and continues till April. During this period there are intensive marketing efforts and bulk of fish are loaded to trucks from fishing ports to the wholesale markets of big metropolitan cities (Ankara, İzmir, Bursa and Istanbul). Small vehicles deliver fish for the needs of local markets and neighbouring cities. In late autumn and winter time, anchovy, bonito, blue fish and horse mackerel are transported in Styrofoam boxes with ice. Refrigerated trucks are used for longer distances. Cold chain is well established in Turkey, vehicles used to carry fish from local wholesale markets or directly from purse seine vessels in fishing ports to targeted cities to be recorded wholesale markets in final destination. When they turn back, bring usually imported fish from Istanbul or fish feed and other

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supplies for the market and fish farms. Main legal document is the certificate of origin at the transportation phase.

Main actors in the marketing process are the wholesalers who have offices in the whole sale markets in each of the Black Sea coastal cities and targeted markets. Fish either are sold in Trabzon Wholesale Fish Market or Wholesale Market in the targeted city after transferring fish in cold chain over auctions which is rather different than in EU countries. Price of the fish is very depended to quantity of fish landed and arrived to the market, its freshness, size of the fish and the demand from retailers. Every skipper or industrial fishing vessel has an agreement with one of the wholesaler and their fish are sold via contracted wholesaler with a commission up to 18%. This high commission covers all the economic losses and cost of transportation, staff costs to upload and download the trucks.

If the supply is more than demand or size of the catch is so small than the allowable minimum landing size, prices goes down and fish consumption increases. If it remains unsold, it is forwarded to fish processing plants for fish meal and oil with cheaper prices (1/5 to 1/10 of the market price). On the other hand capture fishery has the seasonality, out of the fishing season, fresh fish consumption rate decreases due to higher prices. In coastal cities, citizens used to process fish as keeping in brine solution or in salt; especially bonito and anchovy. Some of fish shops and retailers prepare these products to sell their customers in no fishing season. Some part of the anchovy are shocked and marketed in local supermarkets throughout the year and exported to EU markets especially where Turkish workers lived in.

Farm products have different marketing structure. Due to fixed costs; mainly fish feed, energy and staff costs, producers determines the basic price. Some markets and restaurants demand fresh fish, then, harvesting from ponds and cages is carried out upon request. Some others may want chilled and frozen in larger quantities. There is constant supply of farmed fish to the wholesale markets over determined prices by the fish farm. All fish and fish products are kept and carried Styrofoam boxes either fresh with ice or frozen. Majority of farmed fish is deep frozen for the export. Expert import companies or the agents of international companies are always involved in exporting process at the beginning of the production cycle by negotiating/pre-contracting of the producer companies. At the end of the growing season fish harvested from cages/ponds are transferred to the processing plants for cleaning, filleting, gutting and/or freezing. Export process is completed either from Trabzon Airport but mostly from Istanbul after transferring fish by trucks under cold chain. Processing plants prepare fish in different styles according to the demand of the market in different types and volumes.

The minimum standards are determined with legal measures and street markets, local fish shops and wholesale markets are expected to apply all standards described in the regulations.

Officially wholesale markets are under the responsibility of Municipalities from arrival of fish, keeping records, health control and hygienic controls of the market. Unfortunately system doesn't work very well; sales and recordings are carried out by the wholesalers and they report to the market administration. Point controls are done by Provincial Directorate of MoAF or together with Municipality polices.



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Main wholesale markets in the region are Trabzon and Samsun Metropolitan cities, Ordu, Giresun, and Rize. None of them have institutional capacities like the ones in EU countries. Main and common problems of the wholesale markets are:

- Lack of any kind of institutional information in the website of the municipalities,
- No contact addresses,
- No website,
- No transparency,
- No official identity,
- Ineffective management system,
- Lack of effective legal supportive measures for the operation of wholesale markets
- No relationship about the functions of fish markets in the fishing and aquaculture industry and management authorities.
- Not open for the view of the public for the ones who want to know landings in time by species, prices, quality standards, monitoring, share of each wholesaler in marketing, etc.

As conclusion, wholesale markets are not transparent and not functioning very well in Turkey. In order to benefits of the fishermen, fish farmers and consumers, wholesale market regulation need to be aligned according to the modern effective concept requirements including market administration, duties and responsibilities, human resources, transparent (electronic) auction system, storage units and reporting services. Wholesale markets should be put in the required palace for better fisheries management, and need to be useful institution for fisheries economy.

4.2.3. Selling live or processed fish to restaurants

Sale of live fish to the restaurants is very rare. Restaurants usually prefer to buy frozen fish as whole and fillets in some cases. Customers used to eat whole fish cooked in different ways. On the other hand, in case of big trout, they serve fish slices prepared in the restaurant. Main origin of fish for restaurants is the wholesale markets. If any farm located close to the restaurant and farm is in the harvesting period or trout reach the market size orders can be done directly from the farm. These types of sale is not easy for the companies farming fish in sea cages due to difficulty to catch, transfer, box, ice and deliver. Small trout farms producing fish in ponds prefer this type of marketing due to benefit higher price than in the wholesale market and escape from commission costs born in the wholesale market.

4.2.4. Groceries or live for pond stocking

Big supermarkets have fish corners selling variety of fish and fish products of different companies. Out of fishing season, majority of the fish are farmed species from Turkey and imported ones (Table 3). Main species and product types are; sea bass, sea bream and trout as farmed fish. The others are the wild fish caught from the sea or inland waters and imported fish (Norwegian salmon, frozen shrimp, octopus, calamari, etc. Customers used to buy fish from supermarkets due to feeling safety from their veterinary controls, traceability processes, cold chain from farm to shelf, cleaning and gutting services.

Fish corners/supermarkets are also obliged to work on Fish sales regulation of MoAL .

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As it is described before MoAF carried our breeding projects to enhance fish stocks in new build dams, natural lakes and other inland water reservoirs where fish stocks collapsed or destructed. Trout subspecies were farmed by providing adults in forest areas and their juveniles are released to the same rivers and small lakes to increase their population abundance. Mirror carp is another species widely used for the enhancement of lateral lakes, dams and small irrigation lakes for socio-economic purposes for the benefit of local citizens.

4.2.5. Sports (amateur) fishing

Amateur fishing activity is carried on only for sports or recreation, not for financial and commercial gain. Therefore fish caught with permitted fishing gear cannot be sold. “Communique 4/2, Regulating the Fishing for Amateur (Sports) Purposes”, No: 2016/36¹⁶.

4. 3. Marketing channels of fish and fishery products in Turkey

There is high correlation between production, trade and consumption rates. Turkey has considerable high rate of capture fisheries and aquaculture production however consumption per capita is still remains lower than EU and global level, which is 5-6 kg per capita (Table 1). The reason is the nutrition habits and consumption culture of the citizens; majority of the consumers prefer to eat fish within the catch season as fresh and low demand for processed seafood and other marine organisms like crustaceans and molluscs.

Two other important and interrelated factors that affect consumption is the amount of production and price. If the production of migratory fish species such as anchovy, sardine, bluefish, bonito and horse mackerel decrease, naturally consumption amounts also decrease. Especially since September, when fishing season starts the abundant catch of these species may also affect the market price of other fish species and fish prices remain at a low level during this period till December.

Fish consumption rate is also related with the locality of the people are living in. Consumption per capita is over 30 kg in coastal settlements but less than a kg in distant locations to the coasts and highlands.

Turkey is exporter and importer country. Imports have reached to 40 – 45 % of the quantity exported. Though the production in 2019 has increased 33% than 2018, majority of increased quantity were used for fish meal and oil due to abundant catch of undersized anchovy in the Black Sea. Fish meal and oil plants are beneficiaries of the catch of undersized fish due to use of unselective purse seines for pelagic migratory species.

Fish meal and oil exports of Turkey has increased by 57% in the January-October (2020) period according to the same period in previous year to 32 countries, with 26109 tons by issuing 45.4 million US \$.

Table 1. Fisheries production, export, import and consumption in Turkey

¹⁶<https://www.tarimorman.gov.tr/BSGM/Lists/Duyuru/Attachments/65/4-2-Numaral%C4%B1-Amat%C3%B6r-Ama%C3%A7l%C4%B1-Su-%C3%9cr%C3%bcnleri-Avc%C4%B1l%C4%B1c%C4%9f%C4%B1n%C4%B1n-D%C3%bczenlenmesi-Hakk%C4%B1nda-Tebli%C4%9f.pdf>



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Years	Production (tons)	Export (ton)	Import (ton)	Consumption (ton)		Unevaluated	Consumption per capita (kg)
				Domestic consumption	Fish meal & oil		
2000	582376	14533	44230	538764	71000	2309	8
2005	544773	37655	47676	520985	30000	3809	7.2
2010	653080	55109	80726	505059	168073	5565	6.9
2015	672241	121053	110761	479741	176138	6070	6.1
2016	588715	145469	82074	426085	93096	6139	5.4
2017	630820	156681	100444	441573	130917	2093	5.5
2018	628631	177500	98315	499461	47276	3115	6.1
2019	836524	200226	90684	624182	209109	3233	6.3

In the first four months of 2020, with the value of 10.8 million US\$ of fish oil and 9.8 million US\$ of fish meal were exported from Trabzon, and total of 20.6 million \$ income was obtained.

In line with the increasing trend in aquaculture, Turkey needs more fish meal than exports; in 2018 6030 tons of fish meal exported while 132763 tons imported; equivalent to 9.5 million \$ and 179 million \$, respectively. In case of fish oil exports was 10238 tons (22 million \$) and import was 56762 tons (82 million \$). Not only feed industry for aquaculture essentially uses fish meal but also poultry and animal husbandry industry as the vital ingredient of animal feeds.

Comparing with 2018 data, aquaculture production has increased from 314537 tons to 373356 tons in 2019 (Table 2) of which 68.8 % provided from marine and 31.2 % from inland aquaculture. Sea bass is the leading species by 137419 tons, followed by rainbow trout with 123573 tons (116053 tons in inland and 9692 tons in marine aquaculture) and sea bream with 99730 tons.

Table 2. Fish production and value by years

Years	Capture fisheries		Aquaculture	
	Quantity (tons)	Value (million TL)	Quantity (tons)	Value (million TL)
2000	503345	368	79031	140
2005	426496	1575	118277	704
2010	485939	1079	167141	1067
2015	431907	1245	240334	2569
2019	463168	2380	373356	7694

Increasing trend of the value of production from aquaculture with the less quantity than capture fisheries, made aquaculture sector more attractive for the investors. Real value is coming from the export value which is always more for the farmed species. Practically it can be interpreted that capture fish production is more suitable for the consumption of Turkish citizens in the fishing season. Then, farmed species is preferred in no fishing season. But majority of farmed fish have chance to introduce international markets.



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Turkey exported 200226 tons of fish with the value of 1026 million \$ and imported 90684 tons by paying 189 million \$ with wide range of species from various countries. Scomber and salmon from Norway are the most important species in the import list (about 50%).

Turkey exports to 80 countries; of which 70.4% are European countries, 26.5% are Asian countries and a small amount to the others. Most exported countries are Italy, the Netherlands, Germany, Russia and England.

Fresh-cooled fish constitute the largest portion of the exported fishery products, and its share increased from 46% to 62% in recent years. The share of frozen fish decreased from 22% to 13%, while the proportion of fish fillets varied between 14-17%.

Farm prices may vary according to the quantity ordered; from 15 to 25 TL as small quantities takes higher prices. According to the changes of Turkish Lira against US \$ and €, prices can be adjusted which has more impact on domestic markets. In average farm prices for export may vary between € 3-5 per kg of big trout, sea bream and sea bass while their prices are € 6-12 in EU markets. It is believed that the real value can only be reached by creation of the brand/label names under the names of exporter/producer Turkish companies.

There are 180 certified fish processing plants in Turkey; 10 are processing bivalve molluscs, 15 are processing frog legs and snails. As of 2017, number of processing plants has reached to 210 facilities; of which 9 plants process bivalve molluscs, 17 plant process frog legs and snails. It is estimated that 6-7 thousand people are employed in these establishments.

4.3.1. Markets and price

There are variety of fish markets taking place between the ports/farms where fish landed/produced and sale units to the consumers. Figure 14 shows the marketing channels of fish and fish products in Turkey.

If the capacity of the farm located on river sides is small, usually they directly reach consumers by selling in farm, or over small fish shops. As the production increases, farmers intend to open small fish restaurants to sell value added products to increase their earnings.

Farmer producing larger quantities in dam and sea cages, they have more options in marketing; selling to the wholesalers as big quantities, or deserve fish especially for export after processing as frozen, filleted and packed in different types. For big demands they supply frozen whole fish to main wholesale markets in big cities after transporting them in cold chain.

At present more than 75% of big trout or Black Sea salmon are exported either via the exporter company of the producer or other exporter companies by paying commission or other means of payments upon agreement.

In domestic markets price of capture fish production is formed in big wholesale markets by auction (Table 3, Figure 15) and price of farmed fish is determined according to the production cost. Therefore the price of wild fish may show great variation within the year due to quantity of the catch, level of demand, season (fishing or no-fishing period), time of the day of marketing (early or late



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hours), freshness (time of capture and transportation to the market); while price of farmed fish have rather stable prices.

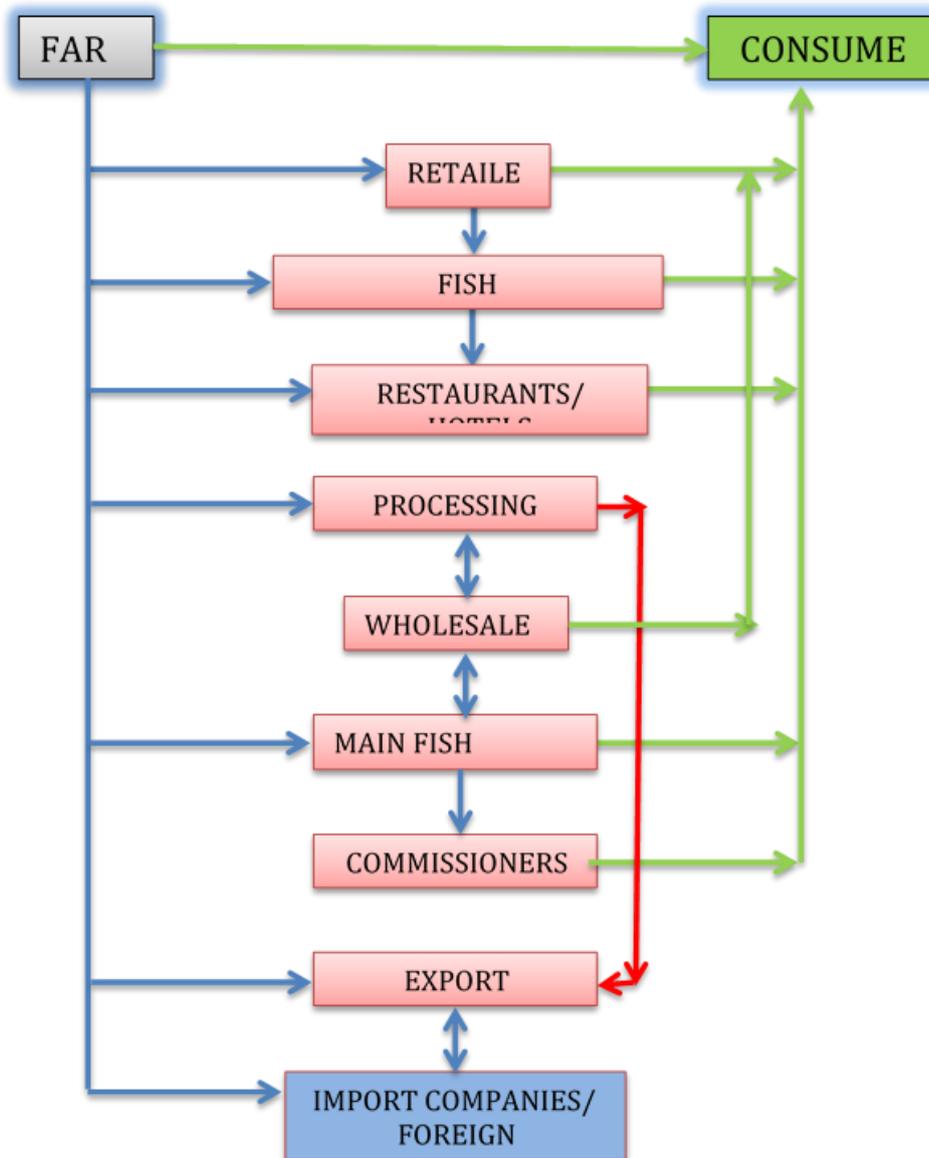


Figure 14. Marketing channels of aquaculture products in Trabzon and Turkey

4.3.2. Product types in markets

There are several types of products delivered to the markets according to the demand from consumers and marketing/export companies (Table 4). Local consumers prefer to buy farmed fish as fresh, but in some cases due to weather and sea conditions frozen products are wanted in the market. Chilling the products with ice is obligatory to keep fish in healthy condition in boxes during marketing. Fresh marketing covers mainly alive fish harvested from the ponds to send restaurants



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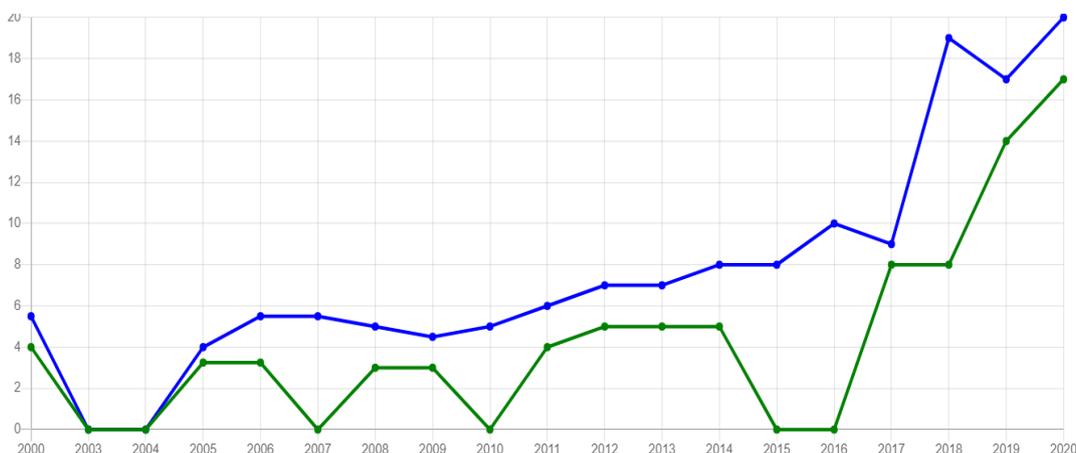


which exhibit trout sp alive in aquariums for the selection of the customers. All of the frozen products are prepared in fish processing plants.

Table 3. Price of farmed fish in various markets on certain dates

Species	Market	Price TL per kg* (Min-Max)	Date
Trout (inland)	Farm/fish shops	20-25	Year average
	Istanbul Wholesale fish Market	17	07/12/2020
Trout (marine)	Bursa Wholesale fish market	20-25	
	Ankara Wholesale Fish Market	17.5-30	
	Trabzon wholesale Fish Market	30-35	11/12/2020
	CarrefourSA	40	14/12/2020
	Migros	80 (Fillet), 75 (slice)	
Sea bream	Istanbul Wholesale fish Market	30	07/12/2020
	Bursa Wholesale fish market	40-60	
	Ankara Wholesale Fish Market	35-45	
	İzmir Wholesale Fish Market	10-60	28/11/2020
	CarrefourSA	40	14/12/2020
	Migros	35-55	
Sea bass	Istanbul Wholesale fish Market	38	07/12/2020
	Bursa Wholesale fish market	40-60	
	Ankara Wholesale Fish Market	37.5-47.5	
	İzmir Wholesale Fish Market	26-55	28/11/2020
	CarrefourSA	47-60	14/12/2020
	Migros	50-60	

*Exchange rate: € 1 = 9.3 TL (28.11.2020); 9.5 TL (07.12.2020); 9.6 TL (14.12.2020)



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Figure 15. Price of big rainbow trout reared in marine cages by years (upper line: max, lower line min price-TL)

Table 4. Types of fish and fish products in marketing process

Product type	Species	Unit weight of fish	Volume of final pack
Fresh	Trout sp, Sea bream, Sea bass	150-250 g	Undefined
Fresh-chilled & fresh cleaned	Sea bass Sea bream	0.2 to 1.5 kg	In EPS boxes as 5,10 & 25 kg
Fresh chilled	Trout	0.4-6.0 kg per fish	
Fresh gutted & chilled	Trout	0.4-4.5 kg per fish	
Fresh-chilled fillets	Sea bass Sea bream Trout	100-600 g 0.2-3.0 kg	
Frozen whole & frozen cleaned	Sea bass Sea bream	0.2-1.5 kg per fish, glazed, In printed bags of 500, 750 & 1000g	In 10 & 15 kg boxes
Frozen whole	Trout	0.4-6.0 kg in printed bags of 0.75- 1kg	In boxes of 10, 15 & 25 kg
Frozen gutted/cleaned		0.4-4.5 kg per fish, glazed, In printed bags of 750 & 1000g	
Frozen fillet with skin or skinless	Sea bass Sea bream Trout	100-600 g per fish, glazed, In printed bags of 500, 750 & 1000g 0.2-3.0 kg per fish, glazed, In printed bags of 500, 750 & 1000g	In 10 & 15 kg boxes

4.3.3. Prices of fish for farming

Aquaculture investments are increasing in the region and Turkey. Progresses in the aquaculture are not the same in each level of breeding. The capacities in ranching/fattening farms increase faster than juvenile production. Therefore cost of juveniles may increase when the demand is high. Trout juvenile supply has become a real problem threatening aquaculture industry in the region. Table 5 shows the cost of trout at different life stages for further farming.

4.4. Research and Innovation

There are huge efforts to develop new meals to supply to the market as new products made from fish which are carried out by the Universities (Faculty of Fisheries, Departments of Fish Processing of Faculty of Marine Sciences, and Departments of Food Technologies of Engineering Faculties. Besides the Universities, research studies also carried out under the supervision and coordination of the General Directorate of Agricultural Research (TAGEM) of MoAF by four fisheries research institutes and a fisheries department.

Such research studies cover to develop technics to extend shelf life of the products, new packaging materials and packing systems, converting traditional processing systems to industrial level, new methods to reduce or minimise chemical and biological contaminations, development of new products as instant fish soups from local fish species, fish doner kebab.



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Table 5. Prices of trout from egg to big sizes

Type	Price
Imported triploid eyed egg	0.25-0.45 TL per egg based to the quantity (average 0.30 TL per egg)
Eyed egg (piece)	0.10-0.15 TL (summer egg) 0.20-0.27 TL triploid summer egg
Eyed egg (piece)	0.08-0.10 TL per diploid egg in normal spawning season
Fry (2-3 g)	0.40-0.50 TL per juvenile
Juvenile (5 g)	0.80-1.20 TL for each piece (varies with time and place)
Juvenile (10 g)	1.5 -2.5 TL each (varies with time and place)
Juvenile (40-50 g)	>50 TL per kg (varies with time and place)
Young (80-120 g)	>50 TL per kg (varies with time and place)
Trout (200-250 g)	20-25 TL per kg (wholesale market)
Trout (200-250 g)	3.0-3.5 US\$ per kg (live sale to net cages)
Trout (> 500 g)	3.0-3.5 US\$ per kg (live sale to net cages)
Trout (> 1000 g)	3.5 -4.0 US\$ per kg (live sale to net cages)

Research studies on fish breeding and aquaculture is very important in order to rational use of resources, to increase production, meeting the increasing demand for fishery products, supporting natural stocks, create new employment opportunities and increase of the exports. Therefore research on aquaculture has been adopted as a general policy in the development plans.

At present, training and awareness-raising activities are carried out to improve the interaction between aquaculture studies and the environment. On the other hand, special care is given to the training of the staff working in the aquaculture and processing industry according to the new technical developments, legal requirements of certification procedures. Life-long learning programs are getting more importance according to the fast developments in the industry.

Fish diseases are very serious threats limiting the development of aquaculture today by causing high mortalities. Therefore providing healthy environment with the minimum stressors is very important to reduce losses and obtain healthy products both at enterprise and national level. Therefore, in terms of fisheries health, research studies are important and the results obtained from these studies can be widely used in disease control and help for the protection of natural stocks. In addition, providing healthy, reliable and high quality products may contribute to the public consumption and meet international standards on fish welfare. Monitoring from farm to fork in parallel with EU practices and control systems should be developed.

4.5. Regulations for fish markets and farmed products

4.5.1. Regulation on Wholesale and Retail Fish Sales

The main legislation is the “Regulation on Fisheries Wholesale and Retail Sales” dated 19.06.2002(Official Journal No: 24790), based on Fisheries Law, 1380 and amended Law, 3288; articles 23 and 29.

This Regulation has been prepared in order to ensure that fishery products are offered to consumers in a fast and safe manner in accordance with hygiene, quality and standards, within free competition conditions.



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It aims to set up the minimum general, technical, hygienic, physical and infrastructural conditions that must be complied with in fisheries wholesale places established or to be established by municipalities and/or real and legal persons, and the establishment, operation, management and operation of these places, retail sale of fishery products and the procedures and principles regarding the conditions that employees should have at the sales points, and the matters related to control and inspection.

Ministry of Agriculture and provincial directorates are authorized to implement this regulation across country.

First chapter defines the terms of the regulation; wholesale markets wholesale centres, retail markets and fish shops which all work in accordance with the conditions set forth in this Regulation. The roles, duties and responsibilities were explained according to the different actors taking part in the operation of markets, i.e. operators, arbitration board, operation manager, responsible manager, controller, audits, producers as fishers and fish farmers, brokers and fish traders. Additional definitions were also made for physical capacities as auction area, cold stores, handling and packaging units. There are articles about whole sales and retail sales, and fees to be paid to the municipality or to the operator company.

Second chapter concerns with the establishment of wholesale fish markets within the borders of the province for marketing seafood. Retailers and fish shops are obliged to have sales document from wholesale market in order to sustain their business. Retail sales are forbidden in wholesale markets.

Regulation describes the locations where the markets can be established, legal and physical requirements, permissions from health, environment and other relevant public administrations, application procedures for the market construction and establishment, and the need for water and electricity supply, water analyses reports, discharging and getting rid of waste water plans and EIA reports (Chapter 3).

Next chapter describes essential infrastructures and their technical features to provide hygienic conditions for different types of markets in various capacities starting from the inlet ramps for the fish entry to the exit of fish boxes sold to the buyers. In this context there are standards to adjust physical conditions of the market building, sanitary and hygienic rules for fish keeping and storage units, exhibition areas and their properties, auction procedures, offices and meeting rooms for different role players, ice making cooling and freezing units, social spaces and their hygiene conditions, registry and data collection/recording systems, pack and packing areas and waste management systems.

Special attention are given to the operation process of the markets regarding coming fish, weighing, counting boxes, recording, keeping as for the type of the product, quality control, label checks, preparation of receipts and transfer documents, inspection and control and auditing mechanisms.



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4.5.2. Communication for supporting processed fishery products (No: 2020/17, dated 12.06.2020)

The Communiqué regulates the procedures and principles regarding the support of processed fishery products to be given to those engaged in aquaculture¹⁷. For 2020, it is determined as to give governmental support 2 TL per kg of processed fish with the upper limit 100 tons.

4.5.3. Instructions for permit of export to fishery business enterprises and issuing a health certificate for the products¹⁸

With this Instruction prepared within the scope of the Veterinary Services, Plant Health, Food and Feed Law numbered 5996, fishing products from our country, live bivalve molluscs, frog legs, processed land snails, live frogs and land snails, and the products of these enterprises and livestock for aquaculture fish, ornamental fish, etc. Rules for issuing health certificates for the export of products are determined.

Businesses wishing to export to European Union (EU) member countries and other countries and operating in the subjects specified in the "Part I" of this instruction must comply with the provisions of this instruction.

In accordance with the "Regulation on Registration and Approval Procedures of Food Businesses", the products produced in food establishments having Business Approval Certificate and Business Approval Number can only be supplied to the market for human consumption.

Enterprises wishing to export are required to obtain an Export Permit from our Ministry within the scope of this Instruction, in addition to the Business Approval Certificate and Business Approval Number received within the scope of the Regulation.

In addition, businesses that want to export primary products such as live frogs, live land snails, juvenile fish for aquaculture and aquarium ornamental fish are required to obtain a Business Registration Certificate and a Business Registration Number covered by the same Regulation.

However, for the export of aquaculture products such as juvenile fish and aquarium ornamental fish for aquaculture, the business license will be valid instead of the Business Registration Certificate.

Businesses that have already obtained export permission before the publication of Law No. permitted business will continue to be included in the lists.

Businesses wishing to export to European Union (EU) member countries and other countries and operating in the subjects specified in the "Part I" of this instruction must comply with the provisions of this instruction.

In accordance with the "Regulation on Registration and Approval Procedures of Food Businesses", the products produced in food establishments having Business Approval Certificate and Business Approval Number can only be supplied to the market for human consumption.

¹⁷ <https://kms.kaysis.gov.tr/Home/Goster/163221>

¹⁸ <https://kms.kaysis.gov.tr/Home/Goster/24875>



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Enterprises wishing to export are required to obtain an Export Permit from our Ministry within the scope of this Instruction, in addition to the Business Approval Certificate and Business Approval Number received within the scope of the Regulation. In addition, businesses that want to export primary products such as live frogs, live land snails, juvenile fish for aquaculture and aquarium ornamental fish are required to obtain a Business Registration Certificate and a Business Registration Number covered by the same Regulation. However, aquaculture such as juvenile fish and goldfish for aquaculture

In the exportation of products, the business breeding license will be valid instead of the Business Registration Certificate.

Businesses that have already obtained export permission before the publication of Law No. permitted business will continue to be included in the lists.

Document regulates authorised profession groups as inspectors; export permissions and its procedures (application and supporting documents as water analyses used in production, updated HACCP plan copy, company registry certificate); in-situ inspections in line with templates of Inspection Form, HACCP System Inspection Form which are prepared by the Ministry of Agriculture and Forestry. Evaluation report will be submitted in 16 days after the inspection process in the Ministry has been completed in 30 days (45 days in total).

According to the supply to be exported, export permission number should be used as 11 for fish, 12 for shrimp, 20 for fresh, chilled, frozen, deep frozen, filleted etc prepared from fish, crayfish, shrimp, etc captured from nature; 30 processed products as smoked, cured, dried marinated, fish oil, by indicating (F) for captured products, (A) for Aquaculture products, etc.

4.5.4. Live, fresh, cooled and frozen products import instructions¹⁹

This instruction determines the controls to be carried out at customs by the authorized officers of Ministry of Agriculture and Forestry at the time of actual import, and the procedures and principles to be applied in these transactions. Main documents to be issued and attached are The Control Certificate, Proforma Invoice or Invoice, health certificate, Fresh, chilled and frozen products to be used as food is the document showing that these products are obtained under appropriate technical and hygienic conditions and that they are in accordance with the national legislation, certificate of origin.

4.6. Administrative bodies and supportive organizations in marketing

- Ministry of Agriculture and Forestry- DG Fisheries and Aquaculture, veterinary and food control services
- Ministry of Health,
- Ministry of Trade, Under Secretariat of Foreign Trade,
- Ministry of Environment and Urbanization,
- Municipalities,

¹⁹ <https://kms.kaysis.gov.tr/Home/Goster/23574>



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- Chambers of Trade and Industry,
- Union of Exporters
- Seafood Promotion Group

4.7. Certificates in farming, processing and marketing

Companies having production in global scale and export potential own various types of certificates regarding their product and processing qualities which are desired in international trade. Important ones can be listed as:

- ISO 9001, HACCP 130001 and ISO 22000 Quality and Food Management Systems and GLOBAL GAP standards for fish feed production,
- ISO 9001, ISO 22000, BRC (British Retail Consortium) and IFS (International Food Standard) Certificates, GLOBAL GAP standards for fish farming units,
- ISO 9001:2000 HACCP 130001 for processing and packaging companies
- Turkish Food Codex Regulation and Codex Alimentaris Commission for all processing plants, pursuant to the national and international food safety criteria () and have the health approval number issued by the EU.
- ISO 9001 Quality, ISO 14001 Environmental Management System, HACCP and ISO 22000 Food Safety Management System, IFS and BRC, and Integrated Global G.A.P standards for fish processing and cold chain.
- ASC (Aquaculture Stewardship Council) Certificate for the safety criteria of fish from net to plate.

4.8. A business plan for marketing in aquaculture industry

According to the existing state of aquaculture, such a business system can be applied to solve existent problems and increase production and exports from the Black sea (Fig. 15). In order to provide more progress in the field of aquaculture, weaknesses and threats should be converted strengths and opportunities by rational methods. Level of success will be closely related to positive motivation of all stakeholders to reach short, mid and long term targets determined by the common understanding.

According to the reports on the Black Sea region, climate change will have an impact as the floods. Therefore essential measures should be taken in short and midterm to get rid of threat of flood (by fostering the farm borders, changing locations, renewal of water intake and discharge systems).

Efficient lobbying activities needed to reduce pollution risks in river basins and impact of hydroelectric power plants on fish farms.



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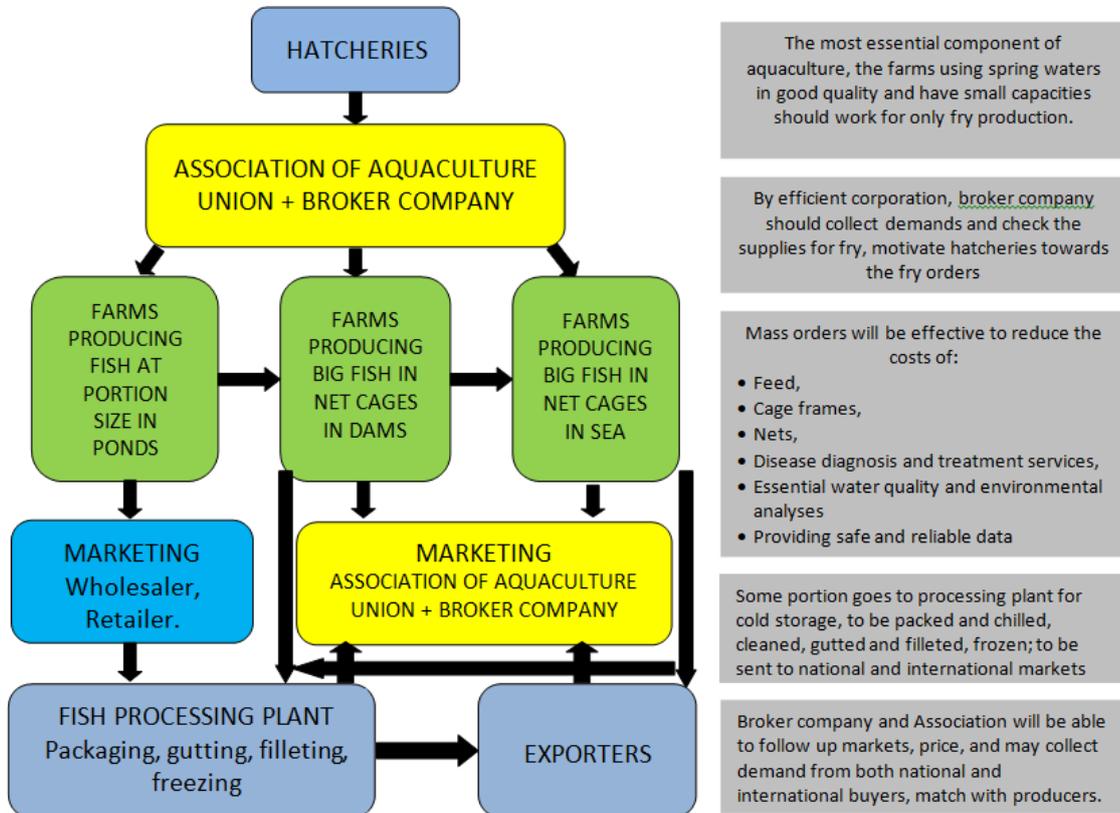


Figure 15. An aquaculture business model for the Black Sea of Turkey

In order to solve such problems, Union of Aquaculture Producers in provinces and top organization Association of Aquaculture Producer Unions (AAPU) need to be more active to communicate with the Ministry of Agriculture and Forestry (MoAF) and other public stakeholders. On the other hand AAPU must change organizational structure from bottom up instead of vice versa. If there is need any legal support, a binding regulation should be drafted and proposed to the MAF.

Main problem in the sector is smooth marketing with good price, high costs of feed and insufficient fry supply. At present majority of the investors are hardly find fry from the hatcheries across country. If AAPU is able to organize such common action to organize suppliers and buyers to determine juvenile need, hatcheries may have chance to produce sufficient amount of fish to cover the need of the industry. Small fish farms can be reorganized as hatcheries only produce fish juveniles intensively. Brokerage system could be established on digital platform to bring producers and buyers together for an active service benefit of the all parties. Same type of role can be acted for the feed, material and equipment supply necessary for production with sufficient quantity, in time with lower costs. On the other hand veterinary services, consultancies and training needs may also be provided under this collective system. Actually it will be a typical platform which can act like a producer organization for the benefits of members.



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Recently, big trout producers have formed a media group to discuss the future of big trout production in the Black Sea Region with the participation of academia, producers, administrative staff, exporters, etc. Their main target is the sustainable production of big trout by creating a brand name (i.e Turkish Salmon, Black Sea Salmon), increasing the attraction in international markets, organization of awareness campaigns to increase domestic consumption as well.

Covid-19 outbreak has worldwide impact on international markets. Fortunately, aquaculture industry has managed overcome of this impact by intelligent approach. When fish sales were decreased, MoAF organized sales campaign with supermarket chains by fixed, reduced price for marketing farm products. International demands cancelled at the beginning, prices went down. Fish farmers stored their products after freezing. When demands started they import this bulk of fish with higher price than the time of strict pandemic closures. Another important result is that farmers did not stop their production and no one lost their job in the Black Sea region.

4.9. Further developments in aquaculture for production and marketing

According to the decisions taken in the last aquaculture summit, The Ministry of Agriculture and Forestry decided to prepare some action plans and implement on certain issues in order to support aquaculture and marketing in Turkey.

- Increasing aquaculture production by increasing productivity with sustainability rules, and promotes farming of alternative species. Target is to produce 600 thousand tons of fish by 2023, and export fish at 2 billion \$,
- New fish farming sites will be allocated, closed intensive farming systems will be promoted,
- Improving licensed cold storage, spreading electronic products trading. Products will be stored in an insured and healthy manner with modern infrastructure. Thus, product losses will be prevented, trade will be recorded, transportation costs will be reduced and market price stability will be ensured.
- Ensuring the sustainability of family business - supporting entrepreneurship in youth, positive discrimination will continue in the projects to be implemented for women and youth. Supports will continue in this period as well in order to economically develop rural citizens.
- Promoting farming in foreign countries, food safety in all conditions, with bilateral collaborations to be made with other countries, it is planned to increase cooperation in the agricultural field (brooder extent), to guarantee the supply of raw materials with the agriculture-based industry, to increase the production area and to expand the trade network.
- Branding in agricultural and forestry products. Creating a Global Scale Brand is one of the main goals of the Ministry. It is planned to determine target markets, to collaborate with ministries on branding and to increase production of value added products.



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4.10. Conclusion

Fish production from aquaculture of Turkey is the only export item in animal food products to EU countries. Annual sales have exceeded 800 million US dollars. According to the plans, 2023 target was 1 billion dollars, but the aquaculture industry upgraded 2023 target to 1.5 billion dollars. Annual fish production in sea farms has reached to 253 395 tons. Farmed fish are exported to 59 countries, and 70% of the exports go to the EU countries. Sea bass and sea bream are the main species in production and exports. The share of sea bass and sea bream in the exports is 60%. Almost all of the trout production from the marine cages is exported to Japan. Recently, the USA and Russia are the new promising countries for the export of aquaculture.

This large production capacity made Turkey the world leader in juvenile fish production.

While EU countries, the USA and other developed countries are more in demand for the consumption of cultured fish, the situation is different in Turkey. Fish from aquaculture has difficulty to enter the kitchen of consumers comparing with the other cultured products; meat, milk, vegetables and fruits are at the forefront. There is strong need to promotion campaigns and public awareness activities on the quality of the farmed fish and importance of fish in nutrition.

5. UKRAINE

5.1. Production and consumption

In 2016, the total consumption of fish and seafood in Ukraine amounted to 432 thousand tons (Fig. 16).

The consistently low demand for fish and seafood is the result of the unstable economic and political situation in the country. The most important factors affecting the consumption of fish and seafood in Ukraine are:

- 5% increase in total inland fishing and a 25% increase in imports in 2008 led to a 20% increase in fish and seafood consumption compared to 2007.
- The financial crisis (2008-2009) caused a drop in fish and seafood consumption of 17% in 2009 compared to 2008 due to a decrease in consumer purchasing power, rising prices for imported goods due to the fall of the national currency and other internal and external factors (Ukrainians were forced replace the fish protein diet with a cheaper one).
- The annexation of the Crimean peninsula and problems with the delivery of fish to the militarized regions caused a decrease in consumption in 2014 compared to 2013.

Nevertheless, 2016 saw a slight improvement in the overall level of consumption of fish and seafood, which could stop the decline of the previous two years.



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Statistics of the State Service of Statistics confirm that the share of imports in monetary terms consumed is much higher than the share of exports (Fig. 16). This can be explained by the fact that national production provides only 20% of domestic demand, the rest is imported.

Changes in fish and seafood exports are due to economic, political and regulatory factors. The largest decline (after 2013) was due to the loss of the Russian market, which made up on average 80-85% of all Ukrainian exports. At the same time, 63% of fish were caught after annexation of the Crimean peninsula.

Imports of fishery products in the amount of 320 000 tons and own fish in the amount of 180 000 tons (officially 90 000 tons) the total volume of the fish market of Ukraine is about 500 000 tons.

Accordingly, with a population of 35 million people in Ukraine, about 14 kg of fish per year.

It should be borne in mind that, according to the United Nations Food and Agriculture Organization (FAO), the recommended rate of fish consumption is 20 kg per person per year. In this case, marine fish should be 75% of the stated norm.

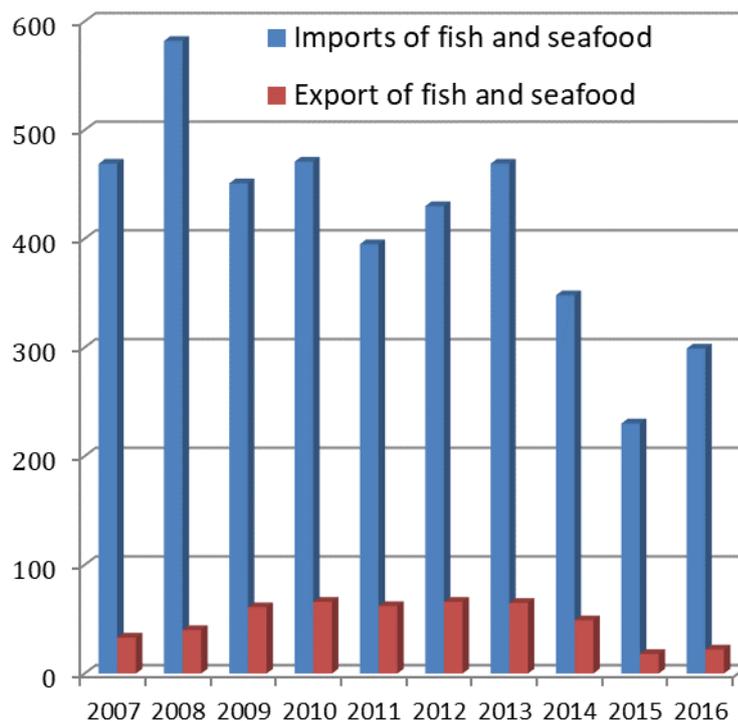


Fig. 16. Exports and imports of fish and seafood in Ukraine during 2011-2016 (USD million).



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5.2. Development of aquaculture industry

An analysis of Porter's five forces was used to determine the level of competition in the industry and to show the aquaculture development strategy. The methodology identifies five forces that evaluate the attractiveness of doing business in the industry.

Analysis includes an analysis of the three parts of "horizontal" competition:

- the threat of the appearance of substitutes,
- the threat of new players and
- competition

and the two forces of "vertical" competition:

- an analysis of the market power of suppliers and
- consumers.

Two industries were compared: aquaculture and poultry as the main competing industries.

Comparative analysis of poultry and aquaculture²⁰:

- The purchasing power of aquaculture consumers is higher than that of poultry
 - high elasticity of demand, so consumers can use less expensive products, in this case - poultry products
 - lack of differentiation in the aquaculture products market compared to the poultry market
 - the absence of some unique substitutes
- Aquaculture suppliers' purchasing power is higher than the poultry market:
 - low level of competition among suppliers in the aquaculture industry compared to the poultry industry
 - high costs associated with changing suppliers due to high dependence on imported feed and other products
- The risks of emerging aquaculture players are higher than in the poultry market:
 - low level of consolidation of aquaculture companies;
 - lower differentiation of products and strength of existing brands in aquaculture compared to poultry industry, respectively barriers to access to this industry are lower;
 - low level of development of aquaculture distribution channels (especially the absence of cold logistics), which reduces the attractiveness of the industry;
 - a high level of regulation of the aquaculture industry (a large number of permits at the entrance to the industry; high requirements from the state: 30 kg of 100 kg to submit to the state expertise of fish quality;
 - long payback period for certain aquaculture species (for caviar business, the average fish ripening period is 6-10 years, and only after that time can the final product be obtained);
 - The level of competition in aquaculture is much lower than in poultry;

²⁰ https://www.slideshare.net/Easy_Business/ss-83657232



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- low concentration of companies;
 - high barriers to entry (over-regulation);
 - low growth rate of the industry;
 - low product differentiation and standardization in the aquaculture industry creates an infinite number of alternatives for the consumer, leading to a constant change in his choice. Because of this, there is a high level of future income volatility in the industry.
- The threat of aquaculture substitute products is lower than in poultry:
 - limited volume of direct substitutes in the market (high price, mainly because they are all imported)
 - the high cost of replacing the product in the aquaculture industry (mainly because they are all imported).

To sum up, the aquaculture industry in Ukraine is characterized by low levels of competition, especially when compared to poultry. Among the main advantages and prospects for the growth of the aquaculture industry in Ukraine are the low level of market consolidation, the limited number of direct substitutes available in the market, the high price of direct substitutes in the aquaculture industry and the high market power of buyers.

5.3. Aquaculture business development

The main constraints for aquaculture business development are low differentiation and standardization of products, lack of quality logistics, over-regulation of aquaculture production, relatively low profitability of the industry and low market growth.

Successful aquaculture businesses rely upon effective marketing strategies developed as a result of comprehensive market planning. Market plans begin with a thorough assessment of the current market situation based on secondary data. Additional direct observations or sometimes market research supplement the broader trends found in secondary data. The market plan then carefully analyzes the strengths and weaknesses of the business, including external threats and opportunities and internal strengths and weaknesses. Careful consideration should be given to whether the market can be segmented and whether the company should focus on one single product or various products and product lines. Examining the product's life cycle and development of a price-quality matrix and a product-space map will help to clarify optimal product positioning strategies. Once the key parts of the marketing strategy are defined (target markets, how to position the product(s), how to price the product, and distribution channels), a financial analysis of the marketing plan needs to be developed as well as a methodology for monitoring and evaluating the company's marketing performance²¹.

Fee fishing is an attractive marketing alternative for many small-scale producers. The increased demand for fishing opportunities and per capita consumption of fisheries products have led to rapid expansion and development in this market. A major benefit is the premium price paid for fish. The price per pound may be as much as double that paid by large processing plants²².

²¹ <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118859223.ch9>

²² <https://thefishsite.com/articles/smallscale-marketing-of-aquaculture-products>



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The initial step in establishing a fee fishing operation is determining what the customer wants. Fishermen's preferences vary from one geographic area to another. This determination should include not only the species and size of fish to use, but also conveniences such as concessions, bait, tackle, restrooms, shaded areas, benches, etc.

Additionally, the potential fee fishing operator must determine where, how and when to sell. Location is an important consideration in determining if fee fishing is a viable marketing alternative. Ideally, fee fishing ponds should be easily accessible from a heavily traveled road near an urban center. Fee fishing customers appreciate convenient parking areas and easy access to ponds. The site should be identified with large signs on the nearest major road, and additional signs on secondary roads. Most fee fishing operations depend on word-of-mouth advertising to attract customers. It is essential that potential customers be able to locate the fee fishing operation.

Marketing through fee fishing requires a willingness to deal with the public and to work long hours, often seven days a week. Considerable management ability is required to provide maximum returns. The primary advantage is the premium price received by the operator.

Small-scale producers may sell fishes to live haulers. Live haulers usually buy fishes at the pond bank, then transport and sell them at other outlets such as processing plants, pay lakes, recreational lakes, or retail outlets. Small-scale producers often have difficulty working with live haulers because the producers lack proper equipment and experience. Live haulers need to know exactly how many pounds, what size, and when fishes will be available. Live haulers prefer not to handle small quantities of fish, less than 1,000 to 2,000 pounds, and in some areas not less than 5,000 to 10,000 pounds. Some live haulers may use small trucks to transport fishes within restricted geographic areas, providing an outlet for 500 to 1,000 pounds of fish at a time. They prefer that fish be of a consistent size.

Another marketing alternative is direct sales of live, whole or processed fish. This option requires a holding facility but offers the advantage of a premium price with a minimum amount of dealing with the public. Specific hours of operation can be established. Small producers may be open only a few hours one day per week. This allows efficient scheduling of time and reduces time lost waiting for a customer. Orders for fish can be taken prior to pick up with all customers required to pick up fish during a specified time.

If processed fish are sold directly to the public, sanitary processing facilities are required. Local public health officials should be contacted concerning regulations for processing and selling aquaculture products.

Direct Sales to Restaurants, Grocery Stores, and Other Retail Outlets. Direct sales to restaurants, grocery stores, or other retail outlets often appear to be a viable marketing alternative for small producers. In most cases they are not. Although there may be many retail outlets in the vicinity, they require a constant supply and consistent size product. A small producer probably will have fish available for only a very short time. Even though the producer might be able to deliver a quality product at a reasonable price, the retail outlet manager will usually choose an established distributor or large producer for convenience and dependability.



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