Analysis of the Croatian freshwater aquaculture sector focusing on carp and trout species

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Aim of the project

This study aims to investigate the current status and development of the Croatian freshwater aquaculture sector focusing on carp and trout in the frame of the current EU production trends, trade tendencies and perspectives on the local and international markets, and marketing opportunities in order to consolidate sustainability and strengthen competitiveness of the Croatian freshwater aquaculture sector.

Methodology

This report is prepared by EUROFISH International Organisation on the request of the Ministry of Agriculture of Croatia. The report includes an overview of production and trade of carp and trout species in Europe, current state of the Croatian production and trends for carp and trout on the domestic market, description of the domestic and international supply chains for the freshwater aquaculture products, and marketing and promotional activities for carp and trout in various countries. Identification of the critical issues along the value chain for Croatian freshwater fish species, SWOT analysis and conclusions represent an important part in the identification of the competitive strengths and opportunities for the Croatian freshwater aquaculture sector.

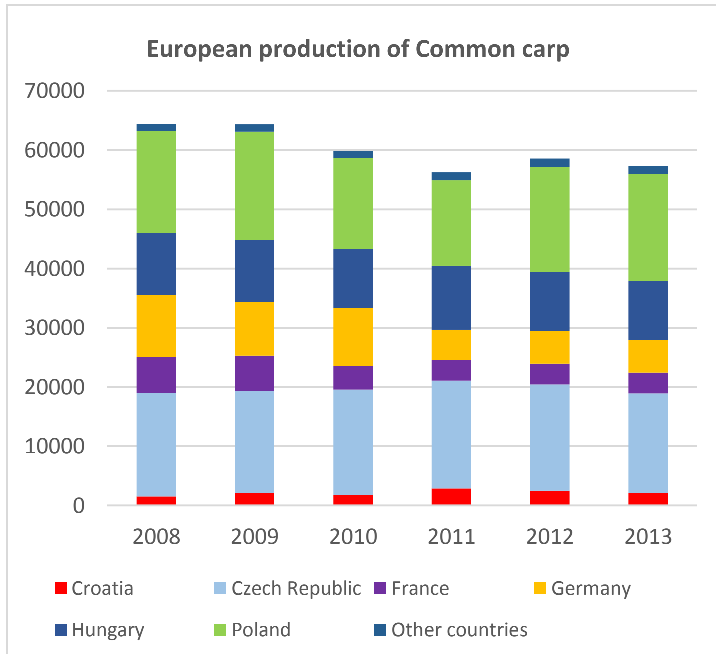
The analysis is based on the outcomes of the qualitative consultations with stakeholders of the freshwater aquaculture sector in Croatia, and own elaborations of available data. Statistics used in the report is based on the data from the Federation of European Aquaculture Producers (production data) and the European Market Observatory for fisheries and aquaculture (trade data). The available information also includes experiences in other countries focusing on marketing of freshwater fish species, as well as other examples of best practices.

1. Overview of production and trade of carp and trout species in European countries

1.1 Production and trade of carp and trout in Europe and its neighbouring countries

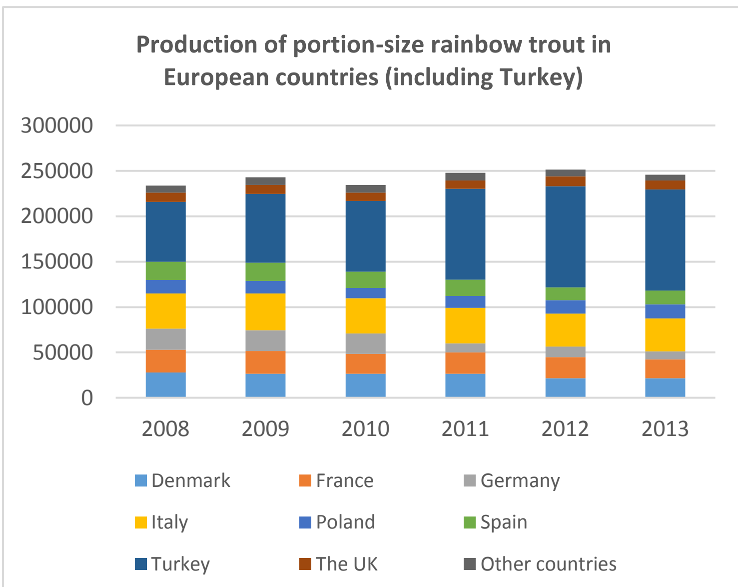
1.1.1 Farming of carp and trout

European supply of carp and rainbow trout is characterized by locally produced farmed species. About 60,000 tonnes of **carp** are produced annually in the European Union, with the main production in Central and Eastern Europe. The biggest producing countries are Poland and the Czech Republic, followed by Germany, Hungary and France. Those five countries are together responsible for almost 90% of the total European production of carp. The output of farmed carp remained more or less stagnant during the last decade with a decreasing tendency in the past several years. The overall EU production volume in the period 2008-2013 slowed down from 64,400 tonnes to 57,250 tonnes. The main decrease was observed in the carp farming sector in Germany where the production output went down two times to 5,500 tonnes in 2013. The largest producing countries, Poland and the Czech Republic, demonstrated stable production trend with the output of 18,000 tonnes and 16,800 tonnes respectively in 2013. Hungary is the third most important carp producing country with nearly 10,000 tonnes. Other important producing countries of farmed carp are France (3,500 tonnes) and **Croatia** (2,100 tonnes). Whereas French production of carp followed the decreasing trend in the indicated period, production of carp in Croatia remained stable.



The issues, which European carp farmers experience in different countries, are common for the whole carp farming sector. Carp farmers suffer from various problems such as cormorants and diseases, and at the same time European farmers are seeking ways of increasing local carp consumption. Traditionally, carp is consumed around Christmas period, and it is sold as live fish, which makes the logistics for carp a real challenge. Moreover, carp faces an increasing competition from imports both from within and outside the EU, and in order to face the challenge, producers have to develop new marketing tactics and innovative and convenient products which attract both existing and new customers. Responding to the market needs, European producers are trying to diversify their carp products by setting up small processing units to supply semi-prepared products (carp steaks, fresh or smoked, filleted or sliced carp) and prepared products based on traditional recipes. A large part of European carp production is also allocated for supplying recreational fishing ponds.

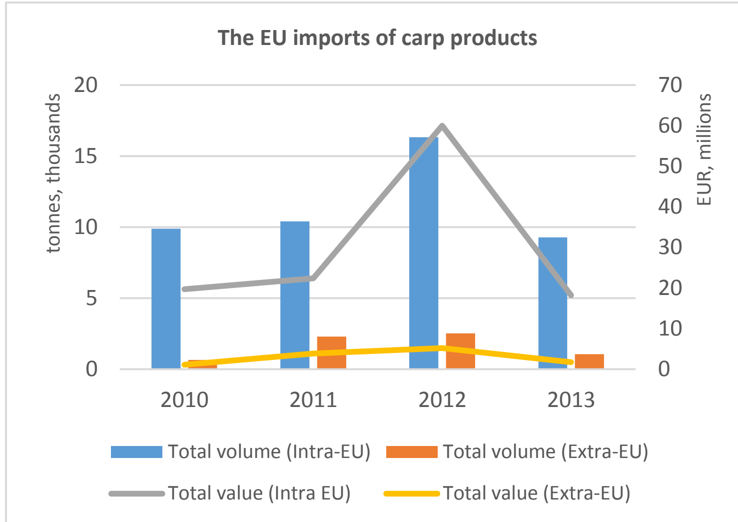
European production of farmed **trout** is represented mainly by portion-size rainbow trout (71%), which is farmed in freshwater, and large rainbow trout (28%) which is farmed in marine waters, as well as a small production of brook trout (1%). Significant part of the portion-size trout is represented by large recirculation aquaculture facilities allowing to produce large volumes of trout at relatively lower costs. Italy, France, Denmark, Spain and Poland are the biggest producing countries of trout in Europe. According to the Federation of European Aquaculture Producers (FEAP), production of portion-size trout in the EU followed a declining trend, in contrast with growing production of large rainbow trout. In the period 2008-2013, the production volume of portion-size trout went down from 168,000 tonnes to 134,000 tonnes. The main decline in production was noticed in Denmark, France, Germany and Spain. The major part of the European rainbow trout farming sector is represented by family-owned and operated businesses, which are located throughout Europe. Many of the farms are equipped to perform primary processing (gutting and gilling), while other farms have full processing facilities, including filleting, smoking, and preparation of various trout products.



Along with decelerating production of trout in Europe, production of rainbow trout in Turkey boosted in the past decade due to the increased technical capacity, support of the public sector and parallel improvements in logistics and processing sector. In a five-year period from 2008 to 2013, Turkish rainbow trout production doubled from 66,000 tonnes to 111,335 tonnes. The significance of the booming Turkish trout products on European market was underlined by many European trout producers claiming that the competition from Turkey puts European trout farmers in an even more difficult situation. The main market issues for European producers of trout can be summarized as follows: stable sale prices along with increasing production costs (including costs of feed, energy, amortization, etc.), moderate demand on most of the markets, and competition with other farmed fish species (especially salmon), and competition with trout from Turkey. Overregulation of the European aquaculture and high costs to adapting to environmental requirements can be mentioned among administrative and legal issues.

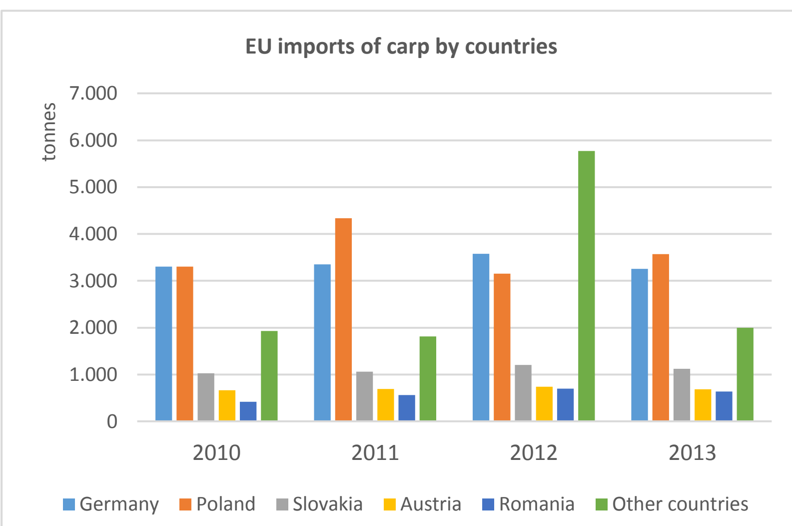
1.1.2 Carp trade

The EU **carp** imports are mostly made up by carp supply from its Member Countries (90%), while the rest of the volume is supplied from Asian countries (Thailand, Myanmar and others). In the period 2010-2013, European carp imports were keeping stable volume at around 10,000 tonnes, except the year 2012 when additional volumes of carp (about 6,000 tonnes) were supplied exceeding 16,000 tonnes. The main part of this volume was delivered though the Netherlands (about 2,000 tonnes), while some increases of carp supply were also noted from Germany (additional 1,000 tonnes), Poland (400 tonnes), and Denmark (300 tonnes). The value of the intra-EU carp imports varied between EUR 20 million and EUR 18 million in 2010-2013, except the year 2012 when it jumped to nearly EUR 60 million due to additional import volume of carp products. In 2012, the Netherlands were responsible for the main part of carp import value with over EUR 21 million, supplying it further to other countries. In 2013, the value of intra-EU carp imports stabilized at EUR 18 million with the Czech Republic making up the largest part of nearly EUR 12 million.



The Czech Republic and Hungary are the main exporters of carp to the European market with 2,800 tonnes and 1,000 tonnes in 2013. Deliveries of carp from the Czech Republic to the EU substantially declined from 6,700 tonnes in 2010 to 2,800 tonnes in 2013, as a result of the decreased production as well as a stagnant character of the carp market in Europe. The Hungarian export of carp to the EU remained stable in the mentioned period with a slight decrease of some 300 tonnes.

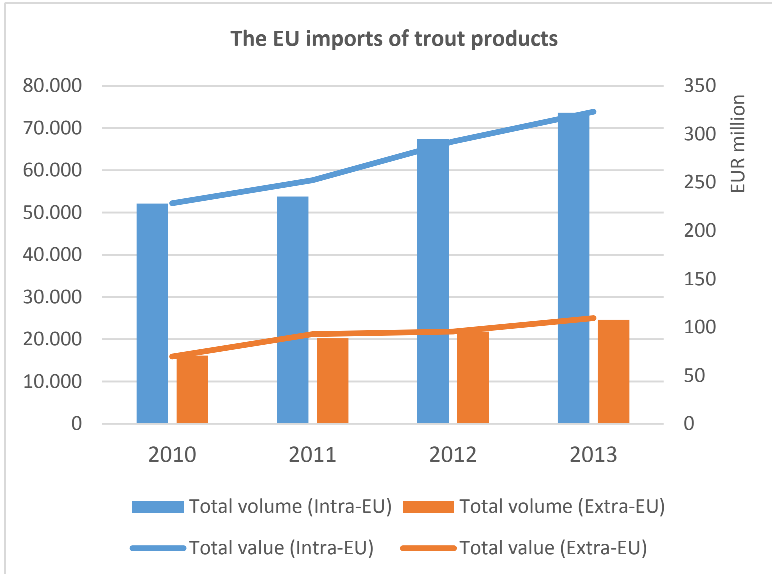
Poland and Germany are the two largest importing countries of carp in Europe, sharing the leading positions in the past several years. In the period 2010-2013, Germany had stable imports of carp at some 3,300 tonnes, while Poland had a mixed trend with an increase in 2011 to 4,300 tonnes and consequent slowing of its imports to 3,600 tonnes in 2013. Carp imports by Slovakia and Austria were stable at 1,000 tonnes and 700 tonnes respectively in the same period. In 2012, there was noted an increase in EU carp imports with the volumes exported through the Netherlands. These volumes were imported mostly by Italy, while in 2013, Italian imports of carp stabilized at some 200 tonnes, as before the increase.



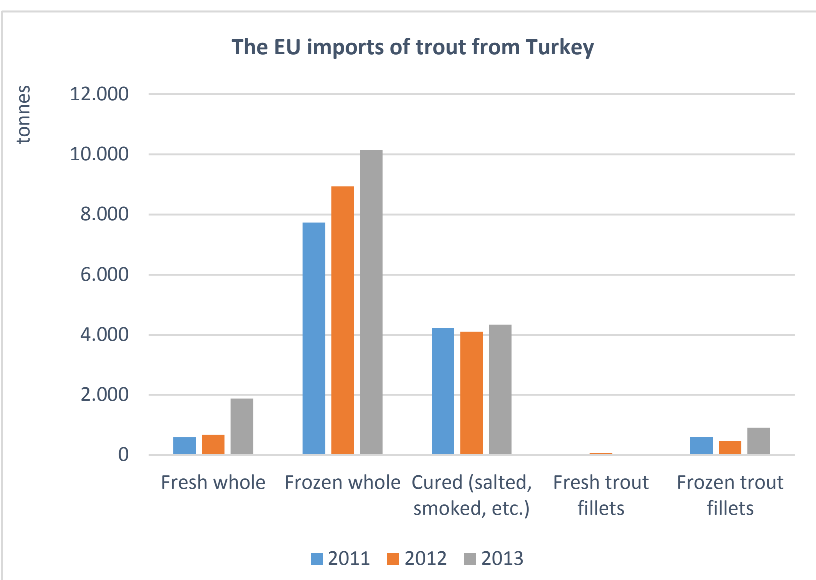
Nearly all carp in Europe is exported as whole fresh (95%), while the rest is exported as whole frozen. On the local markets, European producers offer a range of value added products such as carp steaks (fresh, frozen, smoked, salted or in other forms), carp cuts, soup packages (including by-products such as heads and tails) and carp snacks in form of salted and dried carp, carp pates and other products. Value-added carp products are mostly distributed locally due to the small-scale production volumes.

1.1.3 Trout trade

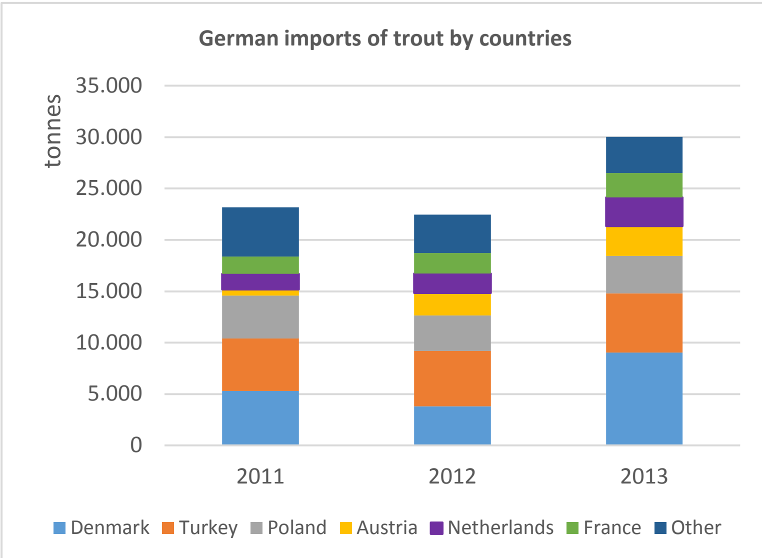
European trade of **trout** products, including portion-size trout and large rainbow trout, has been very dynamic in the past years. Currently, the major part of the trade is represented by intra-EU trade (75% of the total EU trout import volume), while the rest is made up by extra-EU partners (25%). In the period 2010-2013, European imports of trout products from its Member Countries increased 41% in both volume and value reaching 73,600 tonnes valued EUR 323 million. At the same time, European imports from its partners outside of the EU grew 52% in volume and 56% in value reaching 24,650 tonnes valued EUR 109 million.



It should be mentioned that trout trade between the EU Member States is dominated by fresh trout, while EU imports from extra-EU countries are represented mostly by frozen trout. In 2013, the main exporting countries of trout products within the EU were Denmark (16,057 tonnes), Sweden (12,906 tonnes), France (5,933 tonnes), Poland (5,320 tonnes) and Spain (4,716 tonnes). In the period 2011-2013, Denmark significantly increased its exports of trout to the EU with the largest growth among other EU Member States (+52%). Sweden (+26%), France (+34%) and Spain (+41%) followed positive increases in their supply of trout to the EU, whereas a downward trend was observed in Poland (-4%).



The major suppliers of trout to the EU from extra-EU countries were Turkey (17,284 tonnes) supplying portion-size trout, and Norway (4,832 tonnes), exporting large rainbow trout. Development of Turkish trout exports to the EU market has been characterized by the remarkable growth. In 2013, Turkey had the largest share in supply of trout to the EU market among all other countries (18%). In 2011-2013, Turkish exports of trout escalated 31% in volume terms, where frozen whole trout increased by 2,400 tonnes during the indicated period. Turkish exports of whole fresh trout to the EU also showed a significant increase by nearly 1,300 tonnes in the same period. The active expansion of Turkish trout production and exports to the EU of the state subsidized trout raised debates among Europeans producers. In 2014, the Danish Aquaculture Organisation, on behalf of European trout farmers sent a formal complain to the EU Commission. The Commission recognized the fact of unfair competition and decided to enforce a countervailing duty between 7 and 9,7% on imported trout from Turkey.



Germany, Poland, Finland and Austria are the largest European importing countries of trout, while the new emerging market is the UK. The largest consumption markets for trout are Germany, Italy and France.

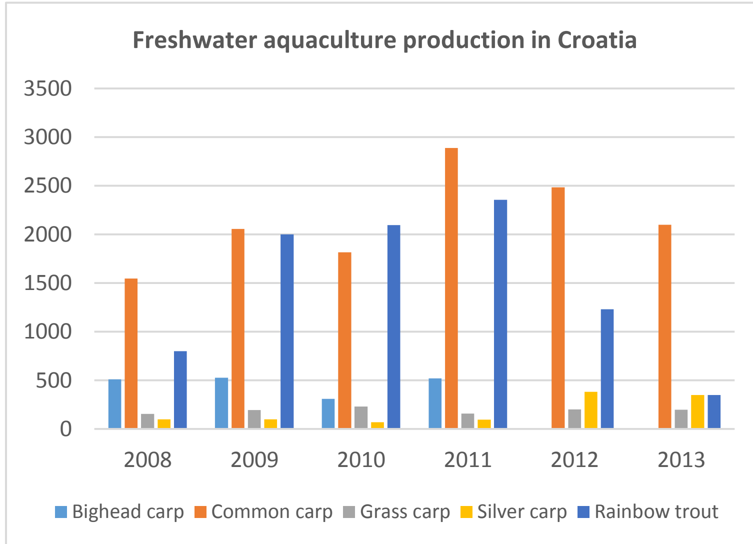
Germany is by far the largest importing country of trout in the EU with a share of over 30%. The country's total imports of trout, including both from intra-EU and extra-EU partners, were 30,000 tonnes, valued EUR 145 million in 2013. The market included 55% of frozen trout mainly with supplies from Turkey and Denmark, 25% of fresh trout with supplies from Denmark, and 25% of smoked, salted and dried trout mostly with supplies from Poland.

Poland is the second largest importing country of trout in the EU, in addition to the country's own large production. In 2013, the country imported nearly 8,000 tonnes of trout, followed by Finland (6,186 tonnes) and Austria (nearly 4,000 tonnes). Italian imports of trout accounted for a minor share (1,400 tonnes), however, considering the country's own trout production of 38,000 tonnes and exports of 8,000 tonnes, Italy represents a very important consumption market for trout products. France imported almost 3,000 tonnes of trout in 2013, adding up to its own production of 32,000 tonnes of trout. In the recent years, increases in the EU trout imports were mainly observed on the German market, while other traditional trout markets were stable or slightly decreasing. A new emerging market, which demonstrated some growth, is the UK, although the trade volumes in this market are rather small compared to the traditional markets.

1.2 Production of carp and trout in Croatia

The freshwater aquaculture sector in Croatia produces primarily common carp *(Cyprinus carpio)* and rainbow trout *(Oncorhynchus mykiss)*, which represent 70% and ca. 12%, respectively, of the total freshwater aquaculture production volume (3,000 tonnes in 2013). Small volumes of Silver carp, Bighead carp, catfish, tench, pike, and zander are also farmed. While Croatian marine fish farming sector demonstrated a significant growth in the past decade, the overall decrease of the domestic freshwater aquaculture production was attributed to the consequences of financial crisis and the subsequent economic difficulties, the disintegration of the sector, restrictions in production and under-utilization of the existing resources due to economic and climatic conditions.

Carp is traditionally farmed in the county of Slavonia, the lowland part of the Eastern Croatia. Common carp represents 74% of the total national carp production, whereas the rest is made up by Bighead carp, Grass carp and Silver carp. In the period 2008-2013, the national data indicated an increase in Common carp production, which was however caused by the new data collection system, while the total Common carp production output was stable at around 2,000 tonnes. Considering the total national production of carp species, the data showed a growth by nearly 340 tonnes in the period 2008-2013, which was mainly attributed to the increased production of Silver carp. The national production volumes of **rainbow trout** drastically declined to 350 tonnes in 2013. Smaller production volumes of trout in the past have directly affected the current level of production.



Even though the domestic freshwater aquaculture represents a relatively small part of the fisheries and aquaculture sector's economy, it has the potential to boost development and jobs in the inland and rural areas of the country. The freshwater aquaculture sector is very important for the maintenance and conservation of biological diversity in the country and supporting vulnerability of the local environment. An eco-system based approach is applied in many fish farms making a part of Croatian ecological network, and a part of the European NATURA2000 ecological network. It was estimated by the national authorities that with a more efficient organisation of the industry and coordinated strategy, this activity could continue to grow up to 20,000 tonnes of annual production. Currently, there is no organic production of freshwater fish species in Croatia, while there is one company producing organic seabass and seabream in the marine aquaculture sector.

1.3 Organic production in the freshwater aquaculture sector in Europe

Due to the lack of the national data on organic aquaculture production, it is difficult to estimate the overall volume of organically farmed carp and trout in Europe. However, organic farming of these species is done in several countries, including Germany, Denmark, France, Spain, Italy and other countries. For example, in **Germany**, organic production of carp and trout followed an important expansion in the past few years, although traditional production of those species developed at significantly higher rates. In the period 2011-2013, the number of farms producing organic trout increased from 43 to 53[1], whereas the total number of farms producing conventional trout increased from 2,038 to 2,598. A similar tendency was observed in the organic production of carp. In the same period, the number of farms producing organic carp grew from 53 to 123, and the number of conventional carp farms increased from 3,008 to 3,852.

[1] Destatis, Statistisches Bundesamt, Wiesbaden 2013

On the German market, more consumers value ecological, organic, and environmentally certified fish species, and at the same time, they value the regional origin of the food. However, the volume of organic fish from the region is still in short supply, where carp or trout appear only occasionally in the assortment of organic stores. Instead, German consumers have the assortment of organic salmon from Scotland, organic shrimp from Ecuador, ASC certified pangasius from Vietnam and other products. Germany also imports organic trout from Denmark.

Denmark is among the leading countries in the European organic aquaculture sector. The Danish experience of organic trout farming is characterised by the rapid development of the organic production of trout and its absorption on the local market and further exports. In September 2005, the first organic trout with red "Ø-label" was presented at a press conference in Copenhagen. Due to the limited production of some 50 tonnes in 2005, in the beginning the organic trout was mainly allocated in the area around the production plants. The sales of organic trout were channeled through direct sales from the organic farms, and supplying to organic shops and supermarkets near the organic farms, all of which were located in Jutland. In 2013, there were 10 organic trout farms in the country with an annual production of 700 tonnes of fish. At present, it is estimated that the Danish annual production of organic trout is 1,000 tonnes. About 90% of the Danish production of organic trout is exported (primarily to Germany), while the rest is distributed on the local market. At present, organic trout is sold on the domestic market in the following ways:

- directly from plants through wholesalers,
- via fishmongers,
- smokehouses,
- through retail stores, and
- online stores with direct deliveries to private and public customers.

The current average prices for organic small trout (up to 250 grams) are approximately 75% higher than conventional small trout. Larger organic rainbow trout (around 300 grams), both fresh and smoked, is available from the country's first organic fish farming at Bisserup near Skælskoer (converted to an organic farm in 2010)[2]. Organic production is seen by the Danish industry as a very important segment which bypasses the competition from Turkey. Consumption segments of organic trout in Denmark and in Germany are regarded by the local industry as strong, and there is currently an increasing number of farmers which opt for organic production. In addition to trout, Denmark produces about 400 tonnes of organic Blue mussels as well as production of organic seaweed and crustaceans has started.

An important change to organic fish farmers is that, according to Commission Regulation No 1364/2013[3], the life cycle of all animals in organic aquaculture must be 100% organic by 1 January 2016, and the previously national organic rules in force have also been harmonized. The regulation requests the exclusively organic fry from 2016, which involves changes to the organic farming sector.

[2] Technical report from Dansk Akvakultur nr. 2014-1
[3] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2013.343.01.0029.01.ENG

Organic aquaculture is practiced in many countries, however, many issues are currently hindering the expansion of this segment. Since many of fish farming facilities are small-scale enterprises, costs, which are needed to obtain organic farming certificate, create a significant burden. However, cost implications for producers can be turned into a competitive advantage if the attention of consumers is drawn on high quality standards and can also contribute to local acceptability of freshwater aquaculture and improved perception of the sector by the general population.

In some cases, legal regulations of organic farming by various certification bodies are adapted to certain standards, which can be in contradiction with the national criteria of organic farming. Therefore, several countries aim to create their own legal regulations and standards on the basis of the national based scientific efforts.

It is important to mention that some international retailers, in particular, German and British retail chains, play a vital role in bringing certified fish products to the marketplace, as requested by their overall corporate social responsibility. The entry and expansion of those retail chain has been one of the most crucial factors for the rapid growth of the organic food sector, including fisheries and aquaculture products.

A possibility of establishing minimum criteria for the development of a Union-wide eco-label for fishery and aquaculture products is indicated in the EU Regulation No 1379/2013 on the common organisation of the markets in fishery and aquaculture products of 11 December 2013[4]: "the use of eco-label for fishery and aquaculture products, whether or not they originate from inside or outside of the Union, offers the possibility of providing clear information on the ecological sustainability of such products. It is therefore necessary for the Commission to examine the possibility of developing and establishing minimum criteria for the development of a Union-wide eco-label for fishery and aquaculture products".

2. Supply chain of the freshwater farmed species

2.1 Supply chain of carp and trout on the Croatian market

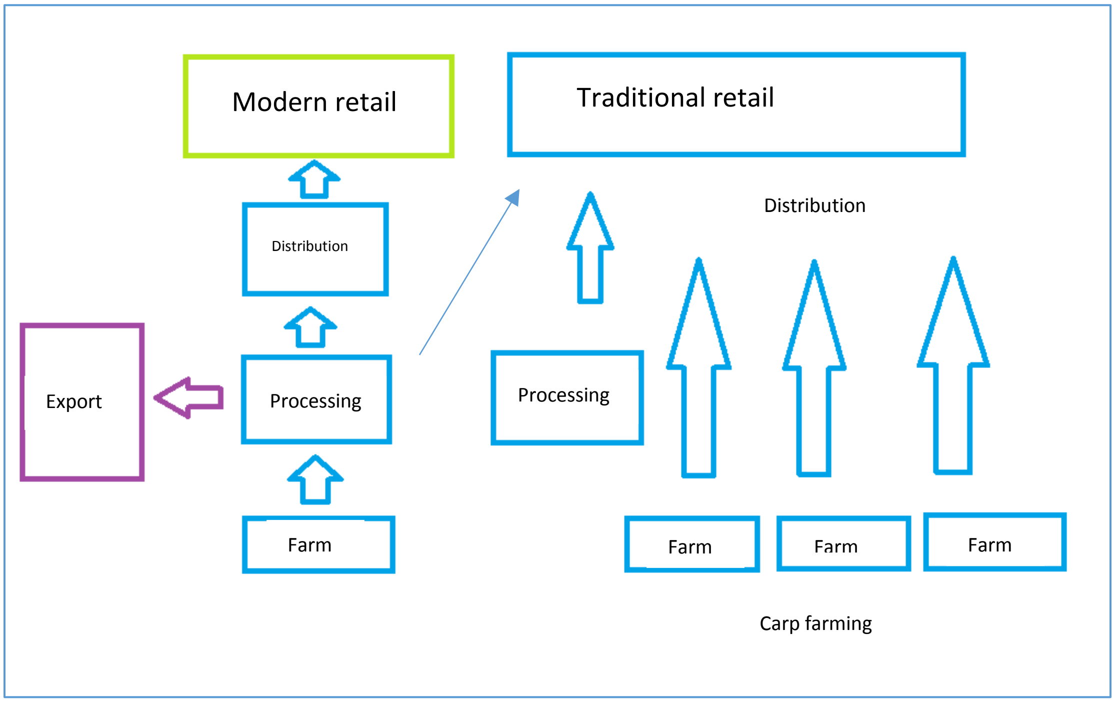
The Croatian **carp** farming sector is divided between the horizontally-integrated structure represented by the majority of carp farming SME's (small and medium enterprises) and a vertically-integrated structure represented by one company, which produces and sells substantial volumes of carp products. The main part of the sector is characterized by a horizontal structure of the supply chain where the majority of small-scale farming companies and a few medium-scale companies sell their carp products in form of live or fresh fish mostly through traditional distribution channels. Traditional sales units include direct sales from farms, open markets, local food service channels and others. Another important sales channel for carp is supplying fishing and angling associations. In the processing sector, there are only two companies which have technological equipment for carp processing.

Along with small-size companies, the carp sector includes one large-scale company with a vertically-integrated system including its own hatchery and farming units, processing units, and distribution

[4] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0001:0021:EN:PDF

system. Producing over half of the total national carp volumes, the company also specializes in production of diversified value-added carp products, in addition to other sectors of its activities. Processed products are distributed through the modern retail channels. Over half of the production in this company is exported to other markets in form of fresh carp as well as value-added processed carp products.

Figure 1: Supply chain of carp products on the Croatian market



It should be noted that until 5-7 years ago, Croatian carp products were distributed only through traditional retail channels and were not presented in the modern retail chains in the country. With the expansion of the modern retail sector and a move to processed carp products, some 3 years ago, the local carp products started to appear in the modern hyper- and supermarkets in the country. The recent appearance of the new value-added carp products, such as carp steaks, cuts, fillets and other carp products, facilitated the move of carp to the modern retail chains making carp available to the larger consumer groups and thus keeping up domestic carp consumption at stable level. At present, carp products are available in most of the modern retail chains. Approximately one third of the national carp production is exported to other markets. Before joining the EU on July 1, 2013, CEFTA countries[5] were the main partners for Croatian carp. After that, the markets of Bosnia-Herzegovina and Serbia lost their importance due to the high taxes. The new markets for Croatian carp products became Austria, Poland, the Czech Republic, Romania and Bulgaria.

The structure of the national **trout** supply chain is also characterised as horizontal, and it is represented by several small-scale farming companies, with some of them having processing units. Trout is sold through companies' channels mostly as live and fresh. Fish is cleaned, gutted and packaged in vacuum. A substantial part of the processed trout products is made up by hot-smoked trout. Most of trout is distributed through traditional retail channels, while a part of the production is

[5] At present, "Central European Free Trade Agreement" inludes Albania, Bosnia-Herzegovina, Macedonia, Moldova, Montenegro, Serbia and UNMIK (Kosovo), 2015

sold through the modern retail chains. It is estimated that over 90% of rainbow trout is distributed on the local market, while a smaller part of the production (Brown trout) is exported to Slovenia.

In the supply chain structure, the segment of carp and trout **logistics and distribution** from producers to consumers represents one of the most difficult sections, especially with regard to the modern retail chains. Whereas the retail chains benefit from the organized centralized distribution systems transporting bulks of products from other countries to their stores in Croatia at reduced costs, there are no logistic companies on the local market specializing in distribution of fish, which requires separate sections from other products and containers with oxygen for live fish. The distribution process for the national freshwater fish is represented by a micro-distribution system where farmers need to organize their own trucks for transporting fish. Local companies try to deliver carp and trout to various sales channels on their own, resulting in transportation of small volumes to numerous remote places several times a week. Some companies try to hire trucks for distribution of fish during the high seasons (typically November-December and March-April), however this solution remains very expensive for the local companies. The issue of logistic and distribution takes up the biggest part of the costs for local carp and trout, making it even more vulnerable to the competition in the modern retail sector. The Croatian freshwater aquaculture industry needs to respond to market changes since many local producers are losing negotiation power with different distribution channels, especially due to the structure and requirements of modern retail sector, which is gradually replacing traditional wholesalers and fishmongers.

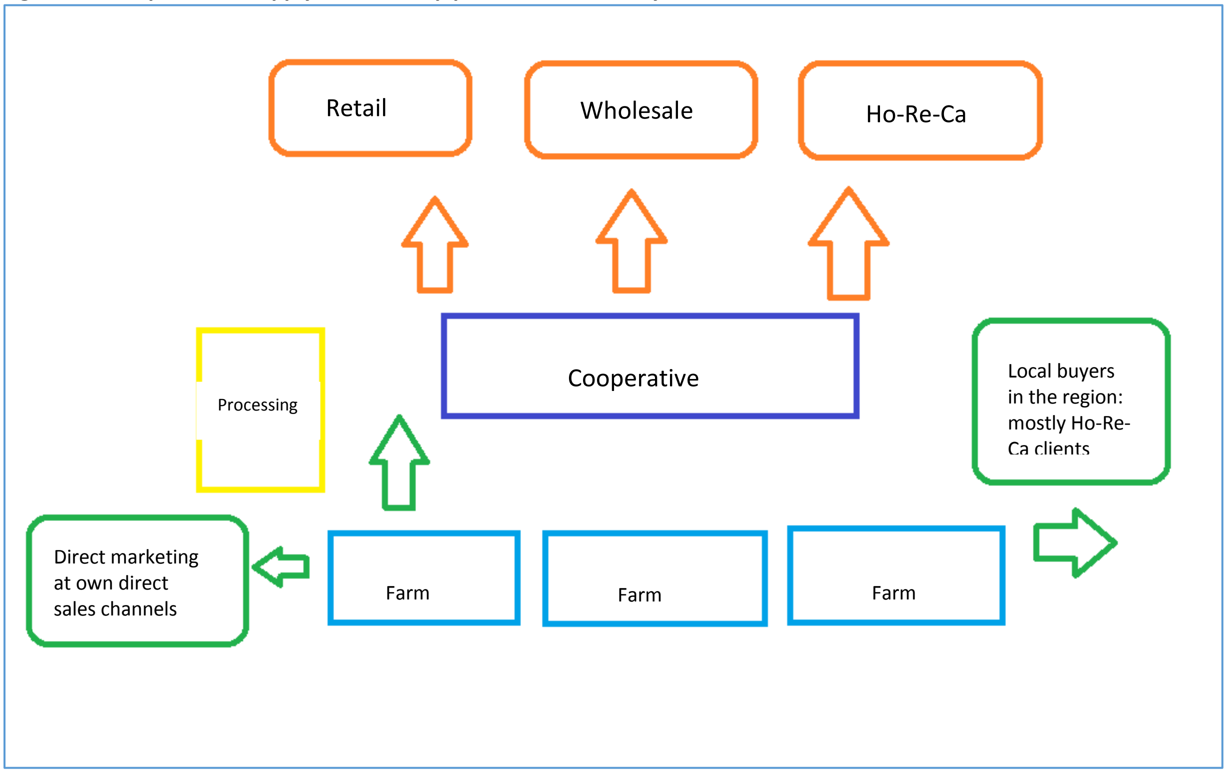
2.2 Supply chain of carp and trout in other countries

Analysing international experience of the freshwater aquaculture supply chain, it should be noted that small-scale producers of carp and trout are characteristics of freshwater fish farming sector in many countries. The fragmentation of the aquaculture sector, and especially the primary production, has always weakened producers' commercial negotiation position. As a response, small-scale producers established cooperatives, producers' organisations and other forms of cooperation. This has enabled access to cheaper and better services (e.g. maintenance, feed supply, legal advice) as well as transfer of know-how and access to markets. Yet, the freshwater aquaculture remains a highly fragmented sector in many countries and producers still lack the ability to respond proactively to emerging market issues and challenges, as well as government regulatory initiatives.

Many European producers of carp and trout sell their products locally at their farms, at local markets or to national supermarket chains. Especially producers of carp are mainly connected to the sales at the local market, while larger volumes of trout are exported to other markets. For example, processing of rainbow trout in **Denmark**, which is farmed in recirculation aquaculture systems, is channelled to a few large companies which collect live fish from other smaller farming companies and slaughter the fish at their factories before the processing. The main processing forms are trout filleting and hot-smoking. These large companies have their own trucks for distribution of fish, including transportation of live trout to Germany. In particular, German processing companies receive live trout from Denmark for further processing, however, this segment has very limited commercial value.

Another market in **Germany** is represented by supplies of live fish to local farm shops with direct sales or in combination with sales to "put-and-take" ponds, facilities people can fish trout and other species, which are released in the ponds.

Figure 2: Example of the supply chain of carp products in Germany



The majority of German trout and carp farmers, practicing pond farming, use direct marketing as their concept of distribution. The local market is the central point of sale, and the sales are done in the three main ways[6]:

- Farmers have a fixed customer base which they supply with carp and trout on the regular basis. These customers are mainly represented by restaurants and cafeterias in the local region.

- Producers formed a cooperative, aiming to secure a larger production amount and a stable delivery. Their customer base is represented by the retail and wholesale traders as well as Ho-Re-Ca segment.

- Fish farmers opt for an "on the spot marketing" and arrange their own restaurant or a processing unit, selling their products close to the production facilities.

Other German carp and trout farming companies use central locations in their respective regions in order to sell their fresh fish at open markets and specialized fish markets.

In **Poland**, where the main part of the annual pond-raised carp production is destined to the domestic market, the sales structure has a specific character. Almost the whole sales volume of carp is concentrated during the two last weeks before the Christmas, and carp is offered by all sellers which

[6] "The role of Aquaculture in fish supply chain", AQUAFIMA, 2013

are authorized to sell fish. Regarding the distribution network for trout on the Polish market, it is interesting to observe some changes over the past years caused by expansion of the retail sector. In 2012, after the active expansion of several national and international retail chains working in the segment of supermarkets and discount stores, the centralized deliveries and a constant availability of fresh trout in those stores improved. According to the estimations on the country's level, fishmongers had the highest share of fresh trout sales (35%), followed by hypermarkets (28%), supermarkets (16%), fish farms (15%), special commercial farms (6%) and other sales channels. However, in the cities with large population, hypermarkets were responsible for up to 50% of fresh trout sales.

Table 1: Network of distribution of fresh trout on the Polish market

Selected sales channels	Availability of fresh trout before 2011	Availability of fresh trout in 2012	Sales structure by interview surveys (n=1063)
Hypermarkets (e.g. Tesco, real, Auchan)	Excellent	Excellent	28% (for big cities – 50%)
Supermarkets (e.g. Lidl, Biedronka, InterMarche)	Depended on the network, mostly none	Good	16%
Fishmongers	Good	Good	35%
Grocery stores	Bad (none)	Bad (none)	-
Fish farms	Available in most farms	Available in most farms	15%
Special commercial angling ponds	Available in many objects	Available in many objects	6%

Source: AQUAFIMA

Lithuanian farms, where carp is also raised in ponds, sell most of their production locally, while some minor parts are exported to the neighbouring countries. Most of the companies trading carp on the domestic market sell their production "hand-to-hand", whereas the largest producers can sell their farmed production to the regional supermarkets. Many companies sell live and fresh fish, and try to add value to their production by processing and diversification of products and customized sales according to the needs of clients.

3. Consumer knowledge and trends for carp and trout

3.1 Croatian market for carp and trout

Croatian market is seen as the biggest potential market for the development of the local aquaculture sector. However, compared to marine species, freshwater species, and especially freshwater farmed species, have a weaker position on the local market lacking an attractive image among consumers. The sales of carp on the local market are described as generally stable. While there is noted an increase in sales of processed carp with the introduction of value-added carp products, the overall sales of live and fresh carp are seen as stagnant. As a consequence, there is no decline in the overall carp sales in Croatia due to the increased supply of carp products in the modern retail stores. Some years ago, carp products were distributed only through traditional channels. Approximately 3 years ago, with the expansion of several international retail chains, such as Lidl, SPAR and others, and development of value-added carp products, the sales of these products in the modern retail sector increased. The newly introduced carp products are carp fillets (fresh in bulk, fresh in MAP), carp steaks and carp chips. Frozen carp products are regarded as being not particularly popular in the country. Some Croatian producers also use bone-cutting machines in order to make carp products suitable for a larger number of consumers because carp bones represent an obstacle for many consumers.

At present, carp is available in most of the supermarkets, and in all segments of the modern retail chains including discounters and hypermarkets. The fastest growth has been observed in discounter chains. The good change for local companies was that now the supermarkets are responsible for unsold fish, while before the unsold products were returned to the companies, and this shift has been very beneficial for Croatian producers. An overview of the typical carp and trout products, which are available in the modern retail stores, is provided below.

Picture 1: Examples of carp and trout products in Croatian supermarkets:

Source: Konzum.hr, 31.99 Kn/kg (04.02.2015) Source: Konzum.hr, 39.99 Kn/kg (04.02.2015) Source: Kinzum.hr, 39.99 Kn/kg, promotion 29.99 per kg

Traditionally, carp has been perceived by Croatian consumers as a fish species in the lower-priced segment, while trout is perceived as a medium-priced fish. Seabass and seabream are placed in the high-price segment. However, comparing the prices of carp and trout in some of Croatian hypermarkets, the trend of price alignment starts to be evident. In the beginning of February 2015, a whole fresh carp cost 31,99 Kn/kg, while fresh carp steaks cost 39,99 Kn/kg.

The price of a fresh whole trout was 39,99 Kn/kg (corresponding to the price of value-added carp products), whereas its price during promotion campaign was 29,99 Kn/kg. The average price for seabass is 55-65 Kn/kg, depending on the store. Although, fresh whole carp is the most popular among carp products, there is a trend of increase in sales of value-added carp products, such as carp steaks. Following the move to “ready-to-eat” products, Croatian consumers show an increasing interest in new carp products, such as carp chips and convenience products.

At the same time, the local market is characterized by a high price sensitivity. The price factor is very important due to the consequences of the economic recession when the consumer purchasing power has been declining over the past years. As a result, Croatian consumers have been reducing their expenditures on numerous items in their categories of purchases, including food products and eating out of homes. Affordability of food products is one of the main criteria which has been attributed to a wide category of food products, including fish. Some consumers, who used to buy more expensive fish (especially seabass and seabream), are now switching to less expensive fish species like carp. Other consumer groups, who used to buy carp, had to switch to other protein sources or noticeably limit its consumption. Following the decrease in consumer purchasing power, the purchasing patterns of

Croatian consumers indicate a trend for preference of smaller portions, for example, a smaller package with 3 carp steaks. The weight of an average package is 450-650 grams, depending on consumer needs.

The expansion of the international retail chains and growing competition on the local market has become a significant challenge for Croatian fish producers. In particular, supermarkets organise promotion campaigns when products are sold below their market price. Supermarkets buy a bulk of various products (oil, fish, meat, etc.), and occasionally sell them at the dumping prices in order to attract more consumers. An example of such strategy can be seen in the German chain of discounter stores "Lidl", which introduced cheap imported duck products. Duck meat was an expensive delicacy product in Croatia, so competition for the local companies increased tremendously, which resulted in the distortion of the market for local producers of duck meat. Fish farmers can face the same situation, especially regarding imported fish from third countries. Such competition is especially seen for trout, when supermarkets import cheaper trout from Turkey, Bosnia and Herzegovina and other countries.

3.2 Consumer knowledge of farmed freshwater fish in Croatia

The sustainable growth of the Croatian aquaculture sector can be secured by continuously projecting a positive image of the Croatian aquaculture products. Compared to marine species, freshwater species, and especially freshwater farmed species, have a more vulnerable position on the domestic market lacking a strong and attractive image among consumers. Several results of the consumer research surveys conducted by the national authorities indicated a lack of consumer knowledge about farmed fish and obstacles in more consistent and positive perception of freshwater aquaculture species.

The main issue of the weak consumer perception is lack of consumer knowledge and awareness about valuable nutrients of farmed fish and its overall beneficial effects on human health. Although some regions of the country have a long tradition of freshwater fish production and consumption, the overall situation reflects confusion of consumers.

In many countries, aquaculture products, and particularly freshwater aquaculture products, have some negative connotations, which in general can be linked to pollution of the environment, use of antibiotics, habitat degradations, lower content of valuable polyunsaturated fat acids as Omega 6, etc. compared to marine fish species and other constraints. However, the image of aquaculture products has been changing from neutral or negative to mostly positive in several countries within the northern region of the Mediterranean countries, especially in Spain, France and Italy. In Croatia, the shift to the positive perception of the aquaculture products has been observed in the marine sector, while the freshwater species still have a less strong image. The positive shift in the perception of aquaculture products and improved public opinion were enabled due to the important efforts which were introduced by the several countries to educate consumers about farmed fish both in marine and freshwater aquaculture sectors.

Observations from the domestic freshwater aquaculture industry indicate that Croatian consumers became more demanding in terms of product information and try to eat food which is environmentally controlled. In particular, Croatian consumers are paying more attention to the declaration of product origin, and they show preference for local products.

Attractive image of the local farmed fish products is crucial for guaranteeing the viability and sustainability of the Croatian aquaculture sector, and especially for freshwater aquaculture. Projecting of the positive image of freshwater aquaculture products can be supported by following aspects:

- capitalisation on high quality products from environmentally controlled production,
- focus on sustainability and certification of the freshwater farmed fish products,
- emphasis on proteins of high biological value, vitamins, minerals and polyunsaturated fatty acids,
- capitalisation on health benefits, including cardio activity, immune system, neural system and other,
- focusing on the local region and traditions,
- attractive diet and lifestyle of the Mediterranean country.

It should be noted that it is highly important to timely combat negative perception of the media and NGOs on aquaculture sector by supporting a positive image of the aquaculture sector and its products.

4. Marketing of freshwater aquaculture fish species

4.1 Marketing and promotion of fish in Croatia

The national aquaculture development strategy highlights the significance of the official marketing strategy for farmed fish products in Croatia, supporting promotional and educational activities in order to increase domestic consumption of farmed fish and fisheries products in general. Together with the Ministry of Agriculture and other partners, the Croatian Chamber of Economy initiated a national campaign to increase Croatians' consumption of fish in 2011. The campaign intended to create an umbrella brand for Croatian fish representing safety, quality, and sustainability of Croatian marine and freshwater fish and seafood. The national brand "Hrvatska ryba – eat what is worth" is oriented at final consumers. The national campaign included numerous promotion activities in Zagreb, Osijek, Split and other cities, roundtable discussions which were broadcasted on national media and distribution of promotional material through retail chains. The activities and promotional materials aimed to bring greater awareness of the health benefits and nutritional value of seafood. The campaign also aimed not just to increase fish consumption during its promotion period, but to enhance a culture of fish and seafood consumption.

At present, activities in connection with the brand are done by individual producers on their own. Current promotional activities by some companies include creation and distribution of information leaflets and advertisements in supermarkets catalogues. All promotion activities are oriented at final consumers, since promotional activities towards retail sector are regarded as too costly for individual companies.

Marketing of freshwater aquaculture products is considered by the local industry as very tough, primarily because freshwater fish is being neglected by consumers. It represents a very small share of the total fish consumption in the country, which is already lower (9 kg/capita) than the EU average level (23.3kg/capita). Moreover, there is a generation of consumers, which are now 30-40 years old, who are not used to consume carp. Compared to this generation of consumers, younger people are more willing to try carp products.

In order to enable development of the domestic aquaculture industry towards a market-oriented approach, there is recognized a lack of reliable data collection and dissemination system. Data on trade and market information, distribution, consumption and emerging consumer trends is essential to ensure the industry's focus on market and anticipation of consumer needs. The available data only allows for assessment of past trends, and does not allow for future predictions. Some years ago, the Ministry of Agriculture started to collect consumer information through consumer researches, analyses and questionnaires, which helped to identify the status of the market development, consumer knowledge about farmed fish, obstacles for increased consumption of farmed fish and other important details. It should be noted that the level of data aggregation needs to be expanded providing more disaggregated data which would help to better understand, create, communicate and deliver consumers' and client´s values within the marketplace. Once specific demand is identified, stakeholders must work to create relationships between production, processing, distribution and marketing stakeholders in which reliable and accurate information can be shared timely. Business development and diversification can be promoted by market-driven research, innovation, and exchange of know-how and best practices.

The need for development and implementation of the coordinated marketing strategy and promotional activities at the national level has been recognized by the national public administration, however, the implementation of such activities has not been established yet. In order to take full advantage of available market information and successfully promote products to consumers, there is a need for collaboration among all stakeholders of the national sector.

4.2 Marketing strategies and promotional activities

In an increasingly competitive international market place, marketing strategies for the promotion of Croatian aquaculture products have to be supported at the national level to benefit the industry of the entire country. Coordinated marketing efforts will increase consumer knowledge and improve the image of the farmed products, thus ensuring the growth of consumer demand. Increasing consumption of domestic aquaculture products achieves multiple objectives. It will give the industry a boost paving the way for its further development and, in addition, it will benefit consumers thanks to the health benefits offered by these products. In the frame of the Common Organisation of the Markets, collective marketing of aquaculture products is done through producer organisations, which play an essential role in implementing the Common Fisheries Policy and the Common Organisation of the Markets, or inter-branch organisations, which brings together fish producers, fish processors and marketers to deploy measures benefiting the sector as a whole. Based on the evaluation of the best practices of international marketing of aquaculture products, the most common marketing strategies can be summarised as follows[7]:

- Coordinated marketing strategies focused on collaboration within business-to-business (B2B) segment (producers, traders, retailers, organisations, and media) though cooperation with industry stakeholders through producer organisation or inter-branch organisation and the largest retailers for joint marketing actions,

- Collaboration within business-to-consumer (B2C) segment driven by emotion and impulse-driven advertising to appeal to people's desires and needs. Public relations and promotional

[7] "Boosting markets for aquaculture products", Eurofish

activities oriented at final consumers choosing a narrow target group of decision makers, oriented at quality and product origin, providing them modern and attractive aquaculture products and service solutions,

- Joint communication concept has to be transferred through all value chain nodes in the industry stressing high quality, attractive image and safety of aquaculture products.

Some possible marketing activities in the frame of marketing strategies could include:

- Joint promotion campaigns in collaboration with the large producers and retailers such as in-store demonstrations and tasting, placement of products outside of the traditional shelf space, distribution of information materials and advertising, participation in exhibitions,

- Highlight an attractive image of Croatian aquaculture products in the activities organised by the large producing and trading companies like competition events, festivals, involving a network of public administration,

- Creation of an arena for business-to-business communication in form of various Master Classes, industry, retail and Ho-Re-Ca meetings, seminars, and teaching programmes,

- Training of consumer segments such as educational programmes for younger consumers and potential consumers (schools and kindergartens) at various educational programmes and events involving mass-media,

- Training of stakeholders in the trade and business-to-business, including the retail sector, training of staff in the Ho-Re-Ca sector, identification and collaboration with restaurant chefs for PR activities,

- High focus on media communication and cooperation with the leading mass-media and business-to-business communication in the industry, supporting a close dialog with press to communicate all activities carried out for promotion of Croatian aquaculture products,

- Provide attractive content and modern information platforms for consumers and business-to-business stakeholders for gaining knowledge about Croatian aquaculture products and ensure systematic promotion directed at final consumers by participation in various programmes, distribution of printed materials and web-based materials, relevant PR and tasting events.

Several countries implemented various national marketing strategies aimed at increasing popularity and consumption of freshwater aquaculture products. Various marketing campaigns were designed at the national level by national governments, public administration or Producer organisations. Some cases of interesting experience of marketing of freshwater farmed products are illustrated by description of activities in Spain, Poland and Norway.

4.3 Analyses of good practices

Spain has successfully implemented various promotion tools to boost consumption of its aquaculture products on the domestic market. As part of the associations, Spanish aquaculture producers are also responsible for developing private certification schemes for retailers, denominations of origin, and promotion materials for final consumers. The main activities, which have been carried out by governmental agencies for the promotion of Spanish fisheries and aquaculture products are (i) support for participation of companies in fairs and exhibitions worldwide, (ii) encouragement and promotion of consumption of fishery and aquaculture products through advertising and promotional campaigns on television, radio, and markets, (iii) education and awareness for consumers, (iv) promotion through governmental bodies, National Association of Marine Aquaculture Producers, several inland aquaculture associations, and regional organisations of producers supporting creation of denomination of origin of aquaculture products[8].

A wide range of promotional activities were implemented by several national associations in the marine and inland aquaculture industry, such as the Association of Marine Aquaculture Producers (APROMAR), Organisation of Producers of Galician Mussels (OPMEGA), the Inland Aquaculture Organisation "OPAC", the Inland Aquaculture Organisation "OPP-22", the Spanish Observatory for Sustainable Aquaculture Foundation, and others. For example, the Inland Aquaculture Organisation "OPAC" and the Spanish Observatory for Sustainable Aquaculture Foundation promoted the inland aquaculture sector focusing on farmed rainbow trout. Promotional campaigns included a series of cooking shows on public television. In order to reach consumers, the flavour, the nutritional value, the freshness and the competitive price of trout were highlighted. The promotion on television led to increased sales, and retailers communicated the result to producers that trout went up from a top-25 product to a top-10 product. "OPAC" committed for innovation and encouraged a new presentation for trout bringing examples of ready-to-cook fresh boneless trout fillets.

"Atrugal"[9] is a Galician organisation with 19 rainbow trout producers representing about 30% of the national inland aquaculture. The promotion is usually done by organisation of events, such as educational conferences and workshops, broadcasting cooking shows and participation at fairs. "Atrugal" is a member of the National Association of Continental Aquaculture (ESACUA), which aims to increase the national demand and consumption of farmed products, increase awareness of products from the region and benefits for the society, and attract new groups of consumers. "OPAC" and "Atrugal" joined ESACUA and together with the Spanish Association for Standardization and Certification created a new certification called "Trucha del Rio"[10]. The main issue of domestic trout consumption on the Spanish market was that while sales of various food products was on the rise in 2013, no growth was observed for trout. Spanish consumers shifted to other products, which were cheaper compared to trout, and the average annual trout consumption stabilized at 0,35 per capita. In addition, trout was very difficult to find on the menus in restaurants.

Picture 2: Innovative recipes of trout are part of interest creation of new consumers (from left to right): roasted trout with vegetable lasagna, trout tempura with curry and lemon mayonnaise, and Galician trout pie with roasted peppers

[8] "Market promotion tools in the aquaculture sector in Spain", FAO

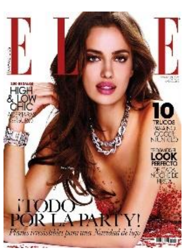
[9] http://www.atrugal.org/web/

[10] http://www.truchadelrio.es/

Source: truchadelrio.es

The marketing strategy included a set of promotional activities, organized by ESAGUA and "Atrugal", directed at various sales channels. In the segment of modern retail buyers, the aim was to increase sales of trout for home consumption. Traditional fish mongers and fish traders were chosen as the main distributors of trout in the segment of direct sellers. Retailers and fishmongers were trained about main nutrition facts and diet benefits of trout. In the Ho-Re-Ca sector, collaboration with the restaurants started with persuading restaurant chefs to include trout in their menus. In particular, fresh trout was supplied to restaurants free of charge for a period of time, and the chefs were asked to offer trout as a dish of the day or in other promotional ways. By this, Spanish consumers were reminded good taste of trout and enjoyed the variety of dishes. Advertising campaigns were running reminding consumers that trout is healthy, tasty and affordable. At the next stage, trout was promoted as a high-class cuisine involving top-chefs recommendations, and was advertised in prestigious newspapers and magazines. The main focus of the campaign was that trout was marketed as a brand, and emphasized quality and trust, reinforcing consumer perception that trout must be present in one's diet on a regular basis.

Picture 3: Women were chosen as the target group for promotion of Spanish trout focusing on health, diet, style and affordable high-class cuisine through magazines "ELLE", "Vogue" and other media channels.



The impact of the campaign and its results were highly evaluated by "Atrugal", and the consumer response was concluded as excellent. After the end of the campaign, the restaurants had kept offering trout on their menus on a regular basis due to the very good feedback from their consumers. The main aim of the campaign was not only to increase consumption of trout in the certain period, but to learn consumers in their overall positive attitude towards trout[11].

The Inland Aquaculture Organisation "OPP-22", which is the major inland aquaculture organisation in the Spanish sector, launched a website "PISCIS Platform". Through this platform, the organisation aims to achieve improved functionality through enhanced communication and presentation utilising online resources. The Spanish associations in fisheries and aquaculture industry also support the implementation for the organisation of fairs and exhibitions, conferences and seminars for the industry and related fields, coordinated purchases and sales, and the creation quality standards.

In **Poland**, the average annual fish consumption was 11,8kg/capita in 2012, which is significantly below the average fish consumption in the EU. National authorities implemented a series of measures to increase domestic fish consumption, targeting young consumers. For example, the government launched fish promotion campaigns "Fish influences all", "Mr. Carp", "Fish products from Poland", and "Now – trout!" The Polish Trout Breeders Association[12] was responsible for the nationwide promotional campaign for trout with the main slogan "Teraz Pstrąg!" (Now – trout!) in the period 2011-2014. The main target was to increase consumption of trout with a particular target of familiarization of Polish society with health benefits and culinary diversity of trout. The main parts of the promotion campaign included advertising activities in television, road billboards, radio, internet and press. The concept of the trout promotion during the years included various themes such as "Health values" (2011), "Barbeque" (2012), "Always and everywhere" (2013) and "Party and fun" (2014). The continuous message of the campaign conveyed the following aspects: a positive image of trout, freshness, local fish farms, local gastronomy and "retro style" of the campaign starting from the year 2012. Restaurant chefs were persuaded to look for trout suppliers and include trout in their menus.

Picture 4: Promotion campaign of trout in Poland in retro style

Source: www.terazpstrag.pl

Statistical surveys and market analyses from monitored results of the campaign confirmed a growing interest of Polish consumers in rainbow trout. The awareness of trout among adult Poles participating in the surveys grew from 2% in 2011 to 5% in 2012. The year after, the percentage of consumers who

[11] E. Pereira, ADSG Atrugal
[12] http://www.sprl.pl/information-about-sprl/information-about-sprl

were aware about trout jumped to 19%, and in 2014, it was 17%. The effectiveness of the trout campaign was evaluated as very high. It was estimated that each PLN 1 spent for promotion should bring PLN 3 in trout retail sales. The calculations of the trout sales increase and the campaign costs brought over PLN 5 per PLN 1 spent for promotion, greatly exceeding the presumed growth. In terms of efficiency of the campaign, the increase of trout consumption during 3 years was foreseen by 1,100 tonnes. In fact, it also went greatly beyond the expectations, increasing trout sales by 3,045 tonnes, confirming the efficiency of the campaign[13].

Pan Karp

The Polish experience with marketing of domestic carp is among the most extensive in Europe. Carp promotional on the national scale was conducted since 2005 under the brand "Pan Karp"**[14]** by the "Pan Karp Fish Promotion Society" together with the Inland Fisheries Institute in Olsztyn. The promotion campaigns that are carried out until now include introduction of the Pan Karp logotype, PR activity and cooperation with media, television and radio campaigns, arrangement of educational activities for children and local promotion. As noted by the organizers, during the most intensive periods of the campaign, recognition of Pan Karp logo was boosted by 33% among consumers.

In the end of 2012 and early 2013, statistical studies were carried out among inland fish breeders from over 400 farms within the framework of the 2020 Carp Strategy project[15]. Over half of all surveyed fishers stated that they had conducted some form of carp promotion, including promotional activities on the premises in their own farms (46%), participation in festivals, picnics and other conventions (40%), and activities within the framework of a fishing organisation (37%). Every fifth farm also included marketing activities on the internet and in the local media, and sponsored local arrangements. Consequently, as a farm's size grew, so did its marketing activities in the area.

Picture 5: Promotional plans of Polish carp in Vatican (left) and promotion in kinder gardens (right)

Under the conditions of growing competition, the primary goal of carp promotion in Poland is seen to maintain carp consumption during the Christmas period, and to promote carp as an indispensable part of the Polish Christmas Eve dinner. Television and radio are the main media sources for promotion due to the large audience which the campaign is targeting. In turn, at the regional and local level,

[13] PTBA Promotional workshop: M.Mikolajczak, A.Zaremba
[14] http://pankarp.pl/
[15] Zbigniew Szczepanski, "Pan Karp" Fish Promotion Society

numerous promotional events such as "Fish Days", picnics, competitions, seminars and festivals will be organized with the help of producers and organisations operating at local level. The second important direction of promotion in the perspective for the next decade is popularization of natural amenities of pond farming and fisheries. Such promotion will not immediately result in direct effects of sales, but it can create a situation in which carp will become a desirable product among representatives of opinion-makers in the society.

The **Norwegian** experience in unification of market information, implementing marketing strategies and different communication activities for the domestic and international seafood industry can be seen as a good example for the Croatian aquaculture industry. Norway has channelled all marketing and promotion activities for Norwegian fisheries and aquaculture to the Norwegian Seafood Council (NSC), a public company established in 1991 and owned by the Ministry of Trade, Industry and Fisheries. The difference from other countries is that responsibilities related to national marketing strategies, plans, actions, consumer analysis, market information, data and communication strategies regarding promotion of Norwegian seafood have all been united within the same body. Joint marketing, market information and communication and reputational risk management form a three-pronged approach to promotion[16].

Joint marketing is carried out with domestic and international industry stakeholders to increase the impact of marketing investments and to achieve the common goal of raising awareness for seafood from Norway worldwide. The NSC now conducts marketing activities throughout the value chain, such as marketing towards businesses, promotional activities in the retail sector, PR activities and investments in various media channels such as TV and magazines. Regarding market information, NSC is the main source of statistics and trade information, trends and developments, updated information on import quotas, tariff rates and trade conditions in various markets. This market information is shared with the Norwegian seafood industry, the Norwegian authorities and within the NSC to provide a reliable decision-making basis. The NSC has 17 consumer websites, all in different languages, which are an integral part of its marketing strategy.

In the field of communication and reputational risk management, the NSC contributes towards strengthening the reputation of seafood from Norway with active information. Corporate communication, press grants, press travel and PR activities are all aimed at increasing market awareness of Norwegian seafood, the importance of Norwegian seafood exports, and stakeholder knowledge of seafood from Norway and NSC. Reputational risk management is important to safeguard and strengthen the image of seafood from Norway and the NSC contributes to the social debate with accurate, updated information about seafood products and the Norwegian seafood industry.

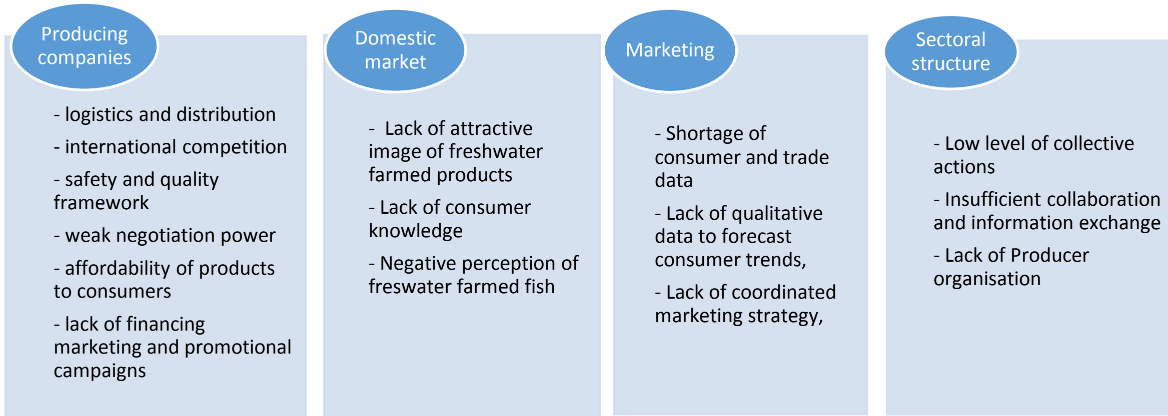
The mentioned above experiences can provide valuable guidance to the Croatian freshwater aquaculture sector enhancing competitiveness of the sector.

5. Identification of the critical issues along the value chain for Croatian freshwater fish species

[16] www.godfisk.no

It has been acknowledged by the national authorities that there is a big potential for the increase of the freshwater aquaculture sector in Croatia. A more efficient organisation within the Croatian freshwater aquaculture sector, its overall integration and its strengthening at various levels could increase the current production output by several times. Along the supply chain, the following most critical issues, which are hampering sustainable development of the Croatian freshwater aquaculture sector were identified as follows in the 4 categories (producing companies, domestic market, marketing and sectorial structure):

Figure 3: Categories of critical issues in the freshwater aquaculture in Croatia



1) In the segment of producing companies, the most critical issue is **fragmented logistics and distribution network**. Due to the absence of specialized logistics companies, Croatian farming companies have to deliver relatively small volumes of their production to many various sales places including modern and traditional retail chains. With the entrance to the modern retail chains, the issue of distribution became more critical because the retail chains offer contracts of small and regular deliveries to numerous places during short period of time. The deliveries have to be frequent, i.e. several days a week, so a producing company can end up delivering several kg of its farmed fish to a large number of remote sales points in the region. So far the companies solve this issue by hiring specialized trucks or by distributing fish with their own transport, but this option remains too costly for the companies, representing the largest part of the product costs. In contrast, modern retail chains benefit from the more integrated structure of supply chain and stronger links to their own suppliers outside the country.

2) **Competition from similar imported freshwater species** is another critical issue to the local producers. International retail chains run active promotional campaigns to attract new consumers and engage existent ones. Periodical sales of imported freshwater fish species from other countries below the market price damage the market for the local farming companies. This tendency has been observed in various categories of food products, and it is expected that it can continue and accelerate in the future.

3) **A decreasing negotiation power** is experienced by the majority of the local fish farming companies regarding the retail sector, especially with the modern retail chains. There are needed continuous large volumes of deliveries, which many companies would not be able to provide,

therefore, traditional distribution channels remain the most important for the large part of the sector.

4) **Quality and safety framework** is a very important issue for domestic freshwater fish farming companies. After joining the EU, some of the local fish producers experienced an appliance of different standards of the same fish species sold on the domestic market. Conformity of the same standards for imported fish is essential for guaranteeing safety and quality of fish products on the domestic market.

5) **Insufficiency of financing marketing and promotional activities** is a barrier for Croatian freshwater fish producers for systematic marketing of their products. Each producing company tries to promote its products individually, which results in periodic activities in form of advertising in local retail catalogues and distribution of information leaflets. Promotion activities are directed at final consumers, and marketing activities towards retail or other business-to-business channels are too costly for individual companies.

6) In the consumer segment, **the lack of attractive image** of freshwater aquaculture products remains a disadvantageous factor for the whole industry. Some groups of Croatian consumers do not have sufficient knowledge about benefits of freshwater fish products, showing preference to marine fish species or generally meat and poultry products. Consumers are often confused by contradicting messages in the media. Due to the lack of freshwater fish consumption habits, some consumers are reluctant to consider those products for the consumption, and especially carp is in the weakest position compared to other species.

7) **Affordability of freshwater fish products** for Croatian consumers is an important concern for the domestic market which is characterized by high price sensitivity due to the tighter consumer purchasing power and disposable incomes. Competition with cheaper imported fish products make the situation more challenging for domestic fish farming companies.

8) **A shortage of consumer and trade data** is an issue for the sector which hinders anticipation of consumer trends and efficient marketing of freshwater aquaculture products. Timely data and market analysis is essential to understand developments in market and value chains.

9) **A lack of coordinated marketing strategy** is an important obstacle for the expansion of the domestic market for freshwater aquaculture products. A set of coordinated marketing strategies and promotional activities should be developed on the national level taking into consideration different characteristics of the local market. The lack of cooperation amongst producers for promotional activities is another issue in the sector resulting in individual promotion with a limited effect on the market.

10) **Insufficient collaboration and information exchange** between participants of the industry is a subject for the unification of efforts and resources of the whole sector. Communication and dialog between the stakeholders, industry and public institutions is essential for the progress of the domestic freshwater aquaculture sector.

11) **A lack of producer organisations** and a low level of collective actions, resulting from the lacking collaboration is an important issue which hinders the development of the sector. The lacking

level of collective actions represents a challenge with the consequent disintegration of the sector hampering its overall development.

6. SWOT analysis and conclusions

Taking into account the present situation in the sector, the following strengths, weaknesses, threats and opportunities for the Croatian freshwater aquaculture sector are summarized in the SWOT analysis below:

Figure 4: SWOT analysis of the freshwater aquaculture sector in Croatia

Strengths	Weaknesses
Sufficient natural resources and biodiversity Maintenance of the local ecosystem Availability of high quality and extra fresh local freshwater fish products Potential for increase of the freshwater aquaculture production Skilled employees working in the sector	Disintegration of the sector Lack of producer organisations Weak interest of local fish farmers in cooperation Insufficient investments in the sector Insufficient marketing skills of individual producers Not-fully coordinated marketing and promotional activities Prejudices about farmed fish in the coastal regions
Opportunities	**Threats**
Local brand/label and organic brand/label to increase value of the domestic freshwater farmed species Strengthening of diversification of carp and trout products with focus on convenience products Raising public awareness through the strengthened image of the Croatian freshwater aquaculture sector Stronger image support though emphasising the region of products origin, high quality and value for health Increasing negotiation power of local producers through producer organisations leading to optimisation of the distribution channels of freshwater aquaculture products and coordinated marketing strategy for the aquaculture sector Integration of the freshwater aquaculture sector with angling and tourism To make full use of the proposed financial assistance from structural funds to support growth and development of the sector Support of educational, vocational programmes and life-long training covering the needs of the freshwater aquaculture sector	Serious damage, caused by predators (cormorants) Lower profitability of the freshwater aquaculture sector compared to other sectors Growth of competition from imported fish Further decreasing share of local freshwater farmed fish on the domestic market Increasing centralized distribution in the retail chains versus individual distribution by local producers

Conclusions

After Croatia joined the EU, the national freshwater aquaculture sector has been influenced by structural changes on the market for both producers and consumers. While international trade has become easier, domestic trade of freshwater aquaculture products became more difficult due to the increased competition. Therefore, Croatian aquaculture sector has to increase its competitive advantages for the entire sector to secure economically, environmentally and socially sustainable development of the sector. Consolidation and coordinated approach are the necessary ways for achieving competitive advantages, and establishment of a producer organisation represents a powerful tool to facilitate collective management and self-regulatory initiatives between producers, processors and retailers. It can lead to creation and support of quality standards, channelling supply, marketing and joint promotion of members' products. Faced with common challenges and opportunities, Croatian freshwater aquaculture enterprises will all benefit from an improved market organisation and structuring of aquaculture producer organisations.

Successful implementation of the provisions of the Common Organisation of the Markets would facilitate the development of the Croatian freshwater aquaculture sector. Applied to the Croatian market and industry of freshwater aquaculture products, the following several pillars for enhancing the competitiveness of the Croatian freshwater aquaculture sector can be suggested:

1. Consolidation of the sector

- Considering the key role **producer organisations** can play through their production and marketing plans, it is important to facilitate establishment of an aquaculture producer organisation in Croatia. It represents an essential part in the optimisation of all nodes of the supply chain of the Croatian freshwater aquaculture sector. The increase of multi-stakeholder participation through a national cooperative framework should be further promoted at the national level by improving dialogue and communication between stakeholders of the entire supply chain.

- Creation of producer organisations would allow to implement measures to channel the supply and joint marketing of their members' products, promote them through certification schemes, geographical designations as well as vocational training.

2. Product development

Responsible aquaculture practices by Croatian producers have to be further encouraged through the best management practices, food safety assurance and traceability – actions that will provide and reinforce the positive image of Croatian freshwater farmed fish products.

- **Certification and labelling** are the most important means to increase product quality of domestic carp and trout products along with growing expectations from consumers for quality and diversity of products, especially locally produced. Eco-labelling could be an important option at the following stages of production and reorganisation of the sector, provided an increasing interest from the domestic market. New labelling provisions, as proposed in the Common Market Organisation Regulation may support better differentiation of the products, and voluntary certification schemes can play an important role in this context.

- **Local/national label or brand** could be developed by the Croatian cooperative framework to increase value of the local carp and trout species. Establishment of quality standards is possible through producer organisations. Positive examples of branded regional aquaculture products from other countries provide a significant asset to the local producers to highlight and distinguish their products in the increasing international competition;

- **Diversification of value-added products**: one of the main options for carp and trout processing companies to extend their market is development of more sophisticated value-added products, which are “out of the standard product”, according to consumer needs. Increased focus on product convenience should be expanded by the local producers of carp and trout, following the apparent trend on the domestic market. Production of ready-to-eat meals, ready-to-cook meals, snacks, ”consumer-friendly” and boneless carp products, and other convenient carp and trout products should be evaluated creating a niche for targeted consumer groups.

3. Supply chain

Improved logistics and the overall supply chain of the Croatian freshwater aquaculture sector represents a substantial part of productivity growth. Economies of scales, as well as new and improved transportation methods can lead to reduced costs for bringing products to consumers. Improving the efficiency of supply chains requires not only factors of production, technology and distribution, but also the following efficient market information systems and management.

- **Optimisation of the distribution chain:** distribution and logistics in the current supply chain can be improved through vertical coordination of primary producers, input suppliers and processing companies. Increasing negotiation power of the stakeholders of the sector though cooperation can lead to better conditions from the side of modern retail chains as well as larger scale of sales in the traditional retail channels;

- **New convenient distribution channels** could be explored according to the needs and demand from domestic consumers. Niche distribution could include collaboration with other service providers such as food service in entertainment and leisure centres, recreational centres, cafes, sport centres, specialized culinary chains and other channels in the modern and traditional retail and Ho-Re-Ca segments for supply of healthy and convenient trout and carp products;

- **Touristic attractions or sports:** Business diversification may provide additional sources of income for freshwater fish farmers, like integration with angling and tourism. Distribution on a regional basis together with touristic attractions or sports, including fishing, leisure, and nature could be an additional asset for domestic producers of freshwater farmed fish in the region;

4. Marketing and promotional activities

The general objective of marketing of domestic aquaculture products is that Croatian aquaculture products shall be positioned and marketed as sustainable, healthy, valuable, nutrient and safe products. Marketing of domestic aquaculture products shall contribute to increased knowledge, awareness and preference of Croatian aquaculture products on the domestic market.

- **Market intelligence tools:** market information, consumer analyses, surveys and studies are the necessary prerequisites to the creation and implementation of marketing strategy and the subsequent promotion activities, detailed consumer information and anticipation of the future trends on the domestic market need to be accessible to the industry and the national authorities;

- **Joint marketing activities:** marketing and promotional activities for freshwater aquaculture products should be conducted in coordinated way as joint activities for the whole sector. The campaigns should aim at raising public awareness and consumer interest through emphasis of the region of products origin, high qualities and safety, and value for health;

- **B2B collaboration:** within possible marketing strategies, a coordinated collaboration with business-to-business sector should be increased. For example, the leading Ho-Re-Ca chefs should be involved to emphasise high quality, tasty characteristics of carp and trout and new ways of gastronomical traditions in the region, representatives of medical sector to stress health benefits of carp and trout consumption as nutritious sources of protein with high content of Omega 3, vitamins and minerals compared to other non-seafood products, and other opinion makers.

- **Educational focus for consumers:** Promoting educational campaigns to consumers, and especially younger consumers, should be continuously enhanced taking into consideration low interest in freshwater fish species in parts of the country. The value of eating fish as well as importance of understanding information contained on labels and attractive presentation forms should be stressed to potential consumers of carp and trout. Education of professionals in the entire supply chains should be emphasised gradually contributing to encouragement of young professionals to enter the sector.

- **Joint communication concept** through all segments of the supply chain is a necessary element in raising public awareness and increasing interest in farmed carp and trout products. Involvement of mass-media, press travels and relevant PR activities involving participation of press. As soon as there have been arisen public debates concerning aquaculture products, stakeholders of the industry have to contribute with the most recent and accurate information on the national level.

Considering a potential increase in the domestic production of freshwater fish species and sufficient volumes for **export**, the following directions of development could be suggested:

- **Exploring new markets:** In addition to the existing export markets for Croatian carp and trout, Germany, being one of the largest importers of carp and trout products in the EU, is seen as one of the most potential markets for further development. However, niche products and distribution should be considered taking into account relatively small volumes of the production compared to other countries delivering freshwater fish species to Germany.

- **Organic production** could be a mean to increase value of exported domestic carp and trout products. There is a strong consumer segment in Germany where eco-labelling is very important, and increasing number of supermarkets and smaller shops select their fish assortment exclusively from sustainable and certified sources, and increasing their choice of organic fish products.

- **Export of value-added products with premium label** is a distinctive option for the local producers along with development of a national brand.

- **Export of live fish** – live fish for recreational fisheries is a profitable alternative market for some European producers of freshwater fish, which could be developed further at a later stage by the Croatian freshwater fish farmers.

To achieve those aims, all relevant actors in the sector should be engaged including authorities, the industry, retailers and representatives of the society. Coordinated action at the national level can help stimulating local economies and meet the growing demand for locally sustainably produced aquaculture products.