

**“Piloting of eco-innovative fishery supply-chains to market added-value  
Adriatic fish products”**

Priority Axis: Blue innovation

1.1 - Enhance the framework conditions for innovation in the relevant sectors of the blue economy within the cooperation area

## **D3.4.1. Socio-economic survey for fishing operators in Croatia**

WP3 - PILOTING OF SUSTAINABLE AND ECO-CERTIFIED FISHERY PRODUCTIONS  
ACTIVITY NUMBER 3 - CAPITALIZING BLUE INNOVATION: ECO-CERTIFICATION OF  
FISHERIES AND FISHERMEN AWARENESS/TRAINING

February 2021

PARTNER IN CHARGE: ZADAR COUNTY

PARTNERS INVOLVED: Zadar County, Fisherman’s Cooperative

Omega3, Fishing Cooperative Istria

Final

Public version

<b>ORDER</b>	<b>ZADAR COUNTY</b>	
<b>TYPE OF DOCUMENT</b>	<b>PROJECT PRIZEFISH - Piloting of eco-innovative fishery supply-chains to market added-value Adriatic fish product REPORT D3.4.1.</b>	
<b>DELIVERY PERIOD</b>	M25	
<b>REPORT EVALUATION</b>	Josip Juračak, PhD, MBA	
<b>MEMBERS OF EXPERT TEAM</b>	Josip Juračak, PhD, MBA	
	Damir Kovačić, PhD	Agrarno savjetovanje d.o.o.
<b>CONSULTATION</b>	Mr. ing. Valentina Andrić	Ministry of Agriculture - Directorate for professional Suport to the Development of Agriculture and Fisheries
<b>PRODUCTION</b>	AGRARNO SAVJETOVANJE D.O.O.	

“This document reflects the author's views; the Programme authorities are not liable for any use that may be made of the information contained therein”.

## Table of content

EXECUTIVE SUMMARY .....	5
1. INTRODUCTION.....	11
2. BASELINE .....	13
2.1. MACROECONOMIC INDICATORS OF ECONOMY AND FISHING.....	13
2.1.1 Gross domestic product and gross value added.....	13
2.1.2 Employment.....	16
2.1.3 Employee benefits .....	19
2.1.4 Business data of entrepreneurs.....	20
2.2 FISHING FLEET.....	25
2.2.1 Number of vessels.....	25
2.2.2 Basic characteristics of fishing fleet vessels by regional units.....	28
2.3 CATCH IN MARINE FISHING .....	31
2.3.1 Landing quantity and value of landing by fleet segments.....	34
2.3.2 Fishing days and days at sea .....	37
2.4 ECONOMIC CHARACTERISTICS OF THE CROATIAN SEA FISHING SECTOR .....	41
2.4.1 Employees and compensation to employees .....	42
2.4.2 Revenues.....	43
2.4.3 Business performance indicators.....	43
3. RESULTS OF THE SURVEY .....	45
3.1 INTRODUCTORY NOTES .....	45
3.2 VESSELS.....	45
3.3 USE OF FISHERY RESOURCES .....	47

3.4	EMPLOYMENT AND SALARIES .....	47
3.5	FISHING ACTIVITY.....	48
3.6	TRENDS IN BASIC BUSINESS INDICATORS .....	49
3.7.	FISH CATCH DATA IN 2019 .....	51
3.8.	ECONOMIC INDICATORS FOR SURVEYED FISHERMEN.....	55
3.9.	SALES CHANNELS.....	58
3.10.	PROMOTION AND WAYS OF IMPROVEMENT OF FISH SALES AND FISHERY PRACTICE.....	65
3.11.	THE IMPACT OF SUSTAINABLE FISHING CERTIFICATES ON FISHERMEN'S BUSINESS.....	68
3.12.	EXPECTED IMPACT OF THE PRIZEFISH PROJECT ON THE FISHERMEN'S BUSINESS .....	70
4.	LITERATURE AND DATA SOURCES.....	73
4.1.	LIST OF TABLES .....	74
4.2.	LIST OF GRAPHS.....	76
5.	ANNEXES .....	77
5.1	ANNEX 1: NATIONAL ACCOUNTS AGGREGATES BY INDUSTRY (UP TO NACE A*64): TOTAL - ALL NACE ACTIVITIES .....	77
5.2	ANNEX 2: NATIONAL ACCOUNTS AGGREGATES BY INDUSTRY (UP TO NACE A*64): FISHING AND AQUACULTURE.....	79
5.3	ANNEX 3: SURVEY QUESTIONNAIRE FORM.....	80
5.4	ANNEX 4: MAIN BUSINESS INDICATORS OF THE CROATIAN MARINE FISHING FLEET .....	85

### Abbreviations used in the text

CBS	Croatian Central Bureau of Statistics
DI	Development index as defined by the Croatian Ministry of Regional Development
EFF	European Fisheries Fund
EMFF	European Maritime and Fisheries Fund
EU	European union
EU-28	European union, all 28 members, with the United Kingdom Fishing techniques:
TBB	Beam trawl
DTS	Demersal trawl and demersal seiner
PTS	Pelagic trawl and seiners
DRB	Dredges
MGP	Polyvalent mobile gears
MGO	Others (to be specified)
HOK	Gears using hooks
DFN	Drift and fixed nets
FPO	Pots and traps
PGP	Polyvalent passive gears
PGO	Others (to be specified)
GDP	Gross domestic product
GVA	Gross value added
HR	Republic of Croatia
HZMO	The Croatian Pension Insurance Institute
K	Thousand
MM	Million
NACE	Statistical classification of economic activities in the European Community
NKD	Statistical classification of economic activities in Croatia
RU	Regional unit in fishery statistics
STECF	Scientific, Technical and Economic Committee for Fisheries

## EXECUTIVE SUMMARY

Within the framework of the Interreg V-A project PRIZEFISH, a socio-economic study was carried out in order to analyse the situation and the possible impact of the project on fishermen and the Adriatic fish market. In the first part of the research, the initial state of the economy and the fishery sector was analysed on the basis of available data, and in the second part, a survey was conducted among fishermen from the areas of Zadar and Istria. The survey covered three topics: (1) resources, activity, employment and business results of fishermen, (2) catch and sale of catch, (3) opinions of fishermen on trends, market, labels for ecological or sustainable fishing and PRIZEFISH project.

### Baseline

#### **Economic importance of fisheries.**

In Croatia, the share of fisheries in the total gross value added of the economy (GVA) was 0.31% in 2017. In the same year, fisheries accounted for only 0.054% of the GVA of the EU-28 economy. Apart from the fact that the share of fishery in the Croatian economy is several times higher than in the EU, this share is growing in the period 2015-2018. GVA is not available for the fishery sector by county. In Istria County, which has the fourth largest GVA in Croatia, the Agriculture, Forestry and Fishing sector (Section A) has a share of 1.3% of the total GVA, and in Zadar County of 5.3%. We estimate that the share of fishery in GVA is about 0.12% in Istria and about 0.48% in Zadar County.

#### **Employment and wages in fishery.**

Fishery employs about 0.30% of all employees in Croatia, while this percentage is 3.7 times lower in the EU-28 and amounts to 0.08% (2018, EUROSTAT). The percentage of employees in Croatian fishery has been gradually decreasing from 2011 to 2019. In fisheries, the share of self-employed in total employment is significantly higher than in the economy as a whole: 66% compared to 13%. According to the Croatian Central Bureau of Statistics (CBS), at the end of March 2019, 2.23% of employees in Istria County were in Section A and 4.46% in Zadar County. The total remuneration per employee in fisheries in Croatia in 2018 was EUR 8,994, which is 66.5% of the average remuneration per employee in the economy. The average remuneration per worker is 33.5% lower than at the EU-28 level.

#### **Business performance of entrepreneurs in marine fisheries.**

The analysis was carried out using data from the Boniteti.hr database for enterprises in the sea fishing activity class (NACE A 03.11). Only companies that submitted their annual financial reports were included, and we estimate that there are 19.4% of them in Zadar County and 9.3% in Istria County. These companies are generally larger than the industry average. The average number of employees per company in sea fishing is 9 people, they have assets with an average value of HRK 4.9 MM and generate

total revenue of HRK 3.9 MM. The number of enterprises is higher in Zadar County than in Istria County. Fishing enterprises in Zadar County have on average 10 employees, HRK 6.3 MM in assets and HRK 4.6 MM in revenues per year. The data for Istria County are largely conditioned by the data of one company that has more than 50% of all employees in sea fishing in the county. Excluding this company, the average indicators for Istria County are about 50% of the same values for Zadar County. In 2018, fishing companies from Zadar County generated an average of HRK 465,090 in revenue per employee, while their profit margin was 7.43% and return on assets was 5.4%. In Istria County, companies in the same sector generate an average of HRK 496,700 in revenue per employee, a profit margin of 0.62% and a return on assets of 0.63%.

#### **Fishing fleet in Croatia and in the regional units of Zadar and Pula.**

Depending on the data source, the total number of vessels in the Croatian fishing fleet in 2018 was 7,573 (CBS), 7,731 (STECF) and 7,174 vessels (Ministry of Agriculture). The latest data from 2019 (Ministry of Agriculture) indicate 7,614 vessels, of which 13.46% in Pula Regional Unit (RU Pula) and 19.42% in Zadar Regional Unit (RU Zadar). The power of the propulsion engine per vessel is 45.72 kW at the level of Croatia, 73.16 kW in RU Pula and 50.47% in RU Zadar. The capacity (tonnage) per vessel are as 5.85 GT, 6.8 GT and 8.68 GT. The largest number of vessels is in segment VL0612, both in Croatia and in the project regions. However, while vessels in the VL1218 segment predominate in the segments above 12 m in RU Pula, in RU Zadar most vessels are VL2440. The data show a significantly higher proportion of vessels of the largest segment in RU Zadar. In terms of fishing technique, i.e. gear, in RU Pula 76% of vessels are distributed in DFN and MGO segments, while in RU Zadar 76% of vessels are in MGO segment. The Zadar fleet is recognizable by the relatively larger share of PS in relation to the total Croatian fleet and RU Pula. Unlike Pula, there are no DRB vessels in RU Zadar.

#### **Catch of fish and other marine organisms.**

In 2019, the amount of catch in Croatia was 61,824 T, with a downward trend since 2016. Pelagic fish have the largest share in the amount of catch (94%), and in this group the main species are European pilchard (73% -78%) and European anchovy (14% -21%). European pilchard and European anchovy are followed with much smaller quantities by red mackerel, Horse mackerel, Hake, Red mullet and Deep-water red shrimp, and these seven species make up to 94% of the catch. European pilchard and European anchovy make up 47% of the total catch value, followed by hake, the only one of other species that has more than 5% in the catch value. The fleet with RU Zadar participates with 46% in the amount of landings and with 31% in the value of fish landings in Croatia (2018). The share of RU Pula are 12% and 16% respectively. Landings of large vessels (over 12 m in length) from the Zadar area accounts for 48% of the total landings of large vessels in Croatia. According to the types of fishing gear, PS has the

largest percentage in the amount of catch. In RU Zadar, the catch of the PS segment is 98% in quantity and 85% in value, while all other segments have up to 6% share. In RU Pula, the PS segment has 82% in quantity and 30% in catch value. In RU Pula, the segments DTS and DFN have over 20% of the catch, and DRB 10%. The number of fishing days per vessel for the entire fleet is higher in RU Pula (62) than in RU Zadar (24). The biggest number of fishing days per vessel have groups of vessels over 18 m in length. Regarding the type of fishing gear, in RU Pula most fishing days per vessel have PS and FPO, and over a hundred days have four more segments (DFN, DRB, DTS and MGO). In RU Zadar, next to the PS segment, only the DTS segment has more than 100 fishing days per vessel.

#### **Economic characteristics of the fishing fleet according to the SCETF report.**

Even though the fishing fleet is among the top five in EU member states, its share in tonnage (3%) and propulsion power (6%) is relatively small. Namely, the largest part of the Croatian fleet consists of small vessels for coastal fishing, which is not always for commercial purposes. Among 23 countries, the Croatian fishing fleet rank is 13th in terms of landing value, 12th in terms of GVA and 21st in terms of net profit margin. The total number of crew members in 2018 was 7,820, of which 40% were FTE. In the same year, the growth trend in the number of crew declined, but the growth in the number of FTE in the crew structure is steady. Since the largest part of the fleet consists of small vessels, it is not surprising that the number of crew per vessel is only 1 person on average. The average remuneration to the crew members is growing annually so that in 2018 it was 12.65% higher than in 2017. The total annual revenue of the fleet is growing, and in 2018 it was 11.66% higher than the average for the period 2014-2017. However, revenue per vessel does not have such distinct growth. The gross added value of the Croatian fleet has a growth trend and in 2018 amounted to EUR 51.4 MM. Gross profit margin was 25.4%, which is less than a previous year, but significantly higher than the average for the period 2014-2017. Net profit margin rose from negative values by 2016 up to 5.4% in 2018.

#### **Survey results**

In Zadar area, 8 fishermen members of the Fishing Cooperative Omega 3 and 4 fishermen non-members of the cooperative were surveyed. In Istria, 33 fishermen were surveyed, of which 22 were members of the Istria Fishermen's Cooperative. Cooperative members are treated as participants in the PRIZEFISH project.

#### **Vessels.**

The biggest number of surveyed fishermen have one vessel, 11 have two, and 4 have three vessels. The average length of vessels in Istria is 9.49 m, tonnage is 7.89 GT, and power is 115 kW. The average length of the vessel for fishermen in Zadar is 25.81 m, the average tonnage is 170.5 GT, and the power is



675 kW. In both surveyed regions, the vessels of the surveyed fishermen have a higher capacity than the average of the whole population. Fishermen use their vessels either exclusively for fishing (56%) or for fishing and other income-generating activities (44%).

### **Employment and salaries.**

All fishermen that employ crew members enter a employment contract. In the Zadar region, all fishermen have employed persons, and in the area of Istria 55% of them are employed. The only other way to hire workers is through seasonal contracts that are supervised and managed by special regulations. One third of fishermen do not have employees, but most of them are obliged to contribute to health and pension insurance. Fishermen that employ people have an average of 7 full-time employees during the year, and the median number of employees is 3.5. The number of seasonal crew members ranges from 1 (Istria) to 9 (Zadar) per fisherman. The average monthly gross salary of full-time employees is around EUR 750, and the median is around EUR 755. In Istria, salaries are higher than in the Zadar area.

### **Fishing activity.**

In 2019, the surveyed fishermen had a total of 6,653 days at sea. The number of days at sea per vessel was 107 in Zadar area and 97 in Pula area. The total catch of all surveyed fishermen was 10,200 T, and the largest part of the catch was made by fishermen from the area of Zadar. The catch per vessel in the area of Zadar was 574 T, and in Istria 9 T. The estimated value of the catch per vessel in the area of Zadar is around EUR 370,000, and in the area of Pula around EUR 30,000.

Trends. According to the surveyed fishermen, the trends in the number of vessels, the number of full-time employees and the average salary are generally stable. In terms of the number of days at sea, the total catch and the total revenue from fishing, the respondents are divided between a stable and a declining trend.

### **Fish catch and other marine organisms.**

Total catch consists of 23 species and mixed catches. Fishermen from RU Pula listed 20 species, and those from RU Zadar only 6. In RU Istria, Sole fish is most often listed, followed by Musky octopus, Red mullet and Cuttlefish. In RU Zadar, European pilchard and European anchovy are mostly caught. Over 90% of the catch consists of the following 5 species: European pilchard (6,359 T), European anchovy (1,961 T), Tuna (477 T), Atlantic chub mackerel (325 T) and Horse mackerel (165 T). Opposed to Zadar, in the area of Istria a significant number of respondents catch shellfish and other marine organisms other than fish.

### **Fishing gear.**

There are big differences between fishermen in the surveyed RUs in respect to the fishing gear used. In the area of Zadar, only purse seine and seine are used, and in the area of Istria, 12 different tools are used. Most fishermen use set gillnet, purse seine and bottom otter trawl. In Istria dredges are used, in Zadar area not.

### **Sales channels.**

By far the most commonly used channel for selling catches is the fishing cooperative (33 responses). Seven fishermen sell to HORECA, and six to export wholesalers, fish processors and fish markets. It is less often sold directly to consumers and domestic wholesalers. As a rule, fishermen have 1 or 2 buyers from the same category, except for the HORECA categories and direct sales. Fishermen's cooperatives have the largest share in sales: fishermen who do business with them sell an average of 89% of their fish to them. Export wholesalers and fish markets also have proportions of more than 50%. The surveyed fishermen believe that, in general, the most important criteria for buyers are freshness of the goods, quality of delivery and the price. Of all the categories of buyers, only processors place price before freshness. When asked about possible changes in the buyer's interests, 17 fishermen indicate an increase in interest in quality (freshness and appearance of the catch). Some of them stated that customers pay more attention to the price of the catch, and some stated the price and freshness.

### **Promotion of fishing products and fishing methods.**

Most fishermen's suggestions (10) were for the promotion of Sole fish, red mullet, and grey mullet on all markets. The second in number (8) was a suggestion to promote all species of fish. One or two fishermen each suggested the promotion of some of the following species: European pilchard, oysters, demersal fish and octopuses on the Istrian market. Regarding fishing practices and fishing methods, fishermen mostly emphasize the need to promote the conservation of fish stocks. Fishermen from RU Pula believe that traditional ways of fishing should be promoted. Promotions of the nutritional value of cheaper fish, the ecological aspect of fishing, and education about the importance of fish consumption for health have been mentioned less frequently.

Ways to improve fisheries. 24 answers to the question of how to improve the current situation in fishing were collected. The most common answers are: purchase of new vessels and equipment (8), financial subsidy for fisheries and purchase of small vessels (5) and stricter implementation of fish stock protection measures.

### **The impact of sustainable or ecological fishing labels.**

According to their expectations, the surveyed fishermen chose the direction and strength of the impact of the implementation of a label on 11 aspects of their business. On average, fishermen estimate that the implementation of labels would have the most positive impact on fishermen's image, competitiveness with other fishermen and the price of fish. The strongest negative impact is expected in the area of operating costs, administration and supervision and certification.

### **The impact of the PRIZEFISH project on fishermen's business.**

Around 50% of fishermen expressed their expectations about the impact of the PRIZEFISH project on the fishermen participating in the project. Most of them said that they expect higher quality of catch and better working conditions after equipping the vessel with a pump through the project. The promotion of fishing, fishermen and fishery products was also mentioned as a possible contribution. Three fishermen said that the project should contribute to increasing the product quality. Six fishermen either do not know what the benefits might be or do not expect to benefit from the project. Two responses express fears that the project will lead to more complications, work and loss of time for fishermen, and in one that only „big“ fishermen (Istria) can expect benefits. Fishermen from Istria are less enthusiastic and fewer have answered this question. Interestingly, the responses of 15 non-project fishermen, namely those through cooperatives were more positive than those of project participants. They primarily expect that the project will bring the participants the opportunity to purchase equipment and make it easier to sell the product.

## 1. INTRODUCTION

The preparation of this study is one of the activities of the PRIZEFISH Project funded by the Interreg V - A cross-border cooperation program Italy-Croatia. The preparation was contracted by Zadar County as a project partner in Croatia.

The main goal of the PRIZEFISH Project is implementing innovative eco supply chains in fishery to place Adriatic fish products with added value on the market. The project leader is Alma Mater Studiorum – University of Bologna. The project has 13 more partners from Croatia and Italy. Two Croatian Cooperatives also take part in the project: Fishery Cooperative Omega3 and Fishery Cooperative Istria. It is expected that the project will benefit firstly the fishermen and other stakeholders of the supply chain of Adriatic fish, but also the population and the public sector due to expanding innovative professions and ideas, and education of public.

The purpose of a socio-economic research within this study is to examine the possible impact of implementing new labels for the products with additional value to the market of the Adriatic fish taking into account the current situations and trends in the fishing fleet, experiences and opinions of fishermen in Zadar and Istria County. The research is based on two data sources:

1. Secondary data sources of social and economic situation, fishing fleet and catch.
2. Primary data source, i.e. data collected by a survey of fishermen, who were involved in the project through cooperatives and fishermen who were not involved in the project.

From secondary data sources, data from publications and databases of European Union (EUROSTAT, STECF) and the Republic of Croatia (Croatian Bureau of Statistics (CBS), Ministry of Agriculture - Directorate of Fisheries, Croatian Pension Insurance Institute) were used. Data on financial results of entrepreneurs from the private Bisnode database were also used. d.o.o.

EUROSTAT data were used for the analysis of the state and importance of fisheries in the overall economy in terms of gross value added, employment and wages.

Data from CBS were taken from their Statistical Reports, online database and Statistics in Line files. These data were used individually or in combination with other sources in the following analyzes:

- gross domestic product in total, by county, and by sector of activity according to the NCEA,
- employment and wages by occupation,
- catch of marine fish and other marine organisms,
- number of vessels in the sea fishery.

Data from Croatian Pension Insurance Institute were used in combination with CBS data for the analysis of employment by activity and by counties.

The analysis of business results of entrepreneurs in fisheries was carried out on the basis of data from the annual accounts of entrepreneurs from the Bisnode Ltd. database. Please note that these data refer only to business entities subject to profit tax, and these are usually enterprises and cooperatives in fisheries.

To elaborate the socio-economic characteristics of the Croatian fishing fleet in the EU context, we used data from the STECF database, and their annual economic reports on the EU fishing fleet.

Data on the structure of the fishing fleet and landings, overall and by regional units in Croatia, were taken from the Podaci u Ribarstvu web-portal (Ministry of Agriculture - Directorate of Fisheries).

As it was not possible to collect the necessary data on financial indicators from the fishermen interviewed, a formal request for these data was sent to Fisheries Administration. In response to the request, data were submitted aggregated by groups of fishermen in relation to participation in the project and the study area (Zadar and Istria). Data were provided for fishermen who submitted a "Socio-economic Data Submission Form for the Fishing Fleet".

It should be noted that data from secondary sources are mostly available at national level, while they are poorly available for sub-national territorial units. Therefore, not all representations and analyses could be carried out at the local level. Wherever possible and necessary, relative indicators for different territorial units were compared.

The first part of the study describes the social and economic conditions, the situation of fisheries and their importance to the economy through the presentation and analysis of available data from these sources. The analysis of the situation covers the following topics:

- indicators on the state of the economy, that is, areas, divisions, groups or classes of economic activities which include marine fishing, depending on the availability of data;
- employment and salaries in the economy, and the economic sector, division, group or class of activity covering marine fishing if data are available, depending on the availability of data;
- basic characteristics of the fishing fleet;
- catch and the value of the catch, that is, landings in sea fishing;
- economic indicators of the fishing fleet.

In the second part of the study, three types of data were collected through a sample survey of fishermen:

- data on fishing resources, employment, income and expenses, and fish catch;
- data on fish catch and sales;
- fishermen's opinions on trends in fishing, the fish market and special labels for value-added products.

Fishermen from fishing cooperatives that are partners in the project, and fishermen who are not members of these cooperatives were interviewed. The former were treated as fishermen participating in the PRIZEFISH Project, and the latter as fishermen not participating in the project.

## 2. BASELINE

### 2.1. MACROECONOMIC INDICATORS OF ECONOMY AND FISHING

Croatia, as a Mediterranean country, has a very long tradition of marine fishing, which has for centuries been the main source of food, income and employment for the local population, next to agriculture and seafaring. In the second half of the 20th century, a strong development of secondary and tertiary activities began developing in the region of the former Yugoslavia and Croatia as its part, due to which the primary activities lost their primary significance for the economy and population. Except for commercial, specialized fishermen, fishing today represents an additional source of income and employment for a part of the coastal and island local community.

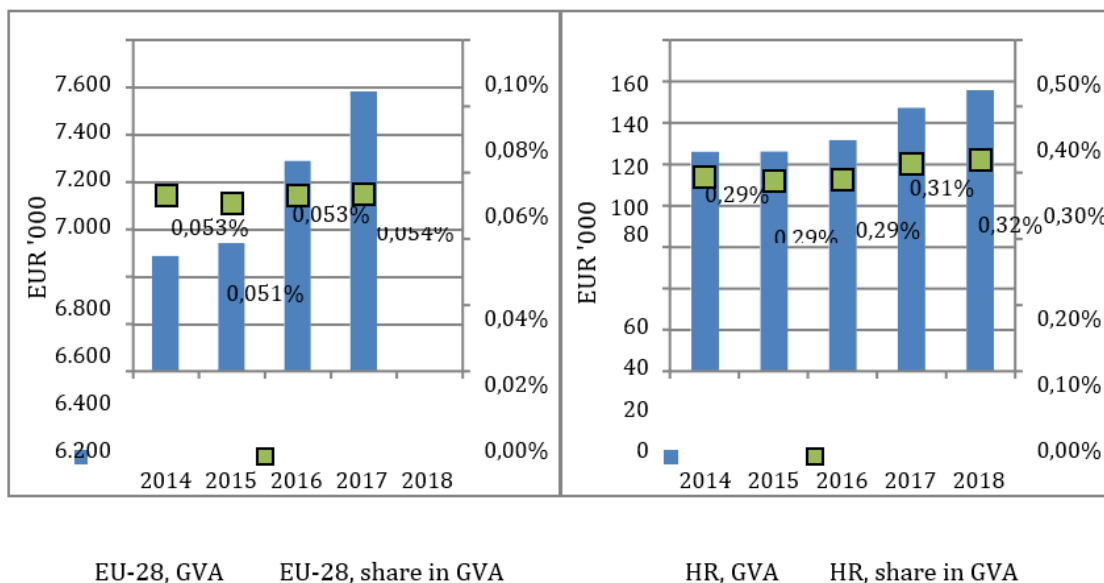
#### 2.1.1 Gross domestic product and gross value added

According to EUROSTAT national accounts statistics, gross value added (GVA) of the Fishing and Aquaculture Sector (Fishery) in Croatia in 2018 amounted to EUR 135.9 MM, which is about 9% of the GVA of Agriculture, Forestry and Fisheries (NACE<sup>1</sup> section A), that is, 0.32% of the GVA of the whole economy. In the European Commission's brochure on Croatian Fisheries (2015), the share of Fishing and aquaculture in total Croatian GDP is assessed between 0.2% and 0.7%, and the total contribution is estimated to actually be 1%, if we take into account other economic activities directly related to fishing. According to the working document of the National Development Strategy of the Republic of Croatia (World Bank, 2019), NACE section A participates with slightly less than 4% in the total Croatian GVA in 2017, which corresponds to EUROSTAT data (3.55%). This is a number that is significantly lower

---

<sup>1</sup> The abbreviation for statistical system of classification of economic activities in the European Community is NACE, from the French Nomenclature statistique des activités économiques dans la Communauté européenne. The same system at the national level in Croatia is NKD from the Croatian Nacionalna klasifikacija djelatnosti. The activities are classified in 4 levels: (1) sections, identified by an alphabetical code, (2) divisions, identified by a two-digit numerical code (3) groups, identified by a three-digit numerical code and (4) classes, identified by a four-digit numerical code (classes). There is a difference between Croatian and EU classification in the way that Fishery in Croatia is under the section A Agriculture, forestry and fishery, while in the EU system it can be a special section B.

compared to the previous period, because the GVA of NACE section A in Croatia decreased annually by an average of 4.4% from 2008 to 2017. Despite a multi-year decline, the proportion of GVA from NACE section A in the total GVA of Croatia is significantly higher than the EU-28 average of 1.65% (EUROSTAT, Graph 1). The proportion suggests that Croatia belongs to the group of less developed EU member states.



**Figure 1. Gross value added (GVA) of the fisheries sector and the share of this sector in the total GVA in the EU-28 and in Croatia 2014-2018**

Source: EUROSTAT

The proportion of GVA from fisheries in total Croatian GVA increases in the period 2010-2019 from 0.20% to 0.31% (EUROSTAT). The average share of GVA of Fisheries in the total EU-28 economy is 0.05%. As it is in the case of the proportion of GVA from NACE section A, the comparison here also confirms the lower level of economic development of Croatia from the EU-28 average. However, at the same time it indicates a greater importance of fishing activity for the Croatian economy.

The level of development of regional (county) and local (municipal) self-government units in Croatia is determined according to the rank of the Development Index<sup>2</sup> (DI, Ministry of Regional Development and EU Funds, 2018).

Counties are classified into 4 classes: two classes with the DI ranks below the median of all counties and two classes with ranks above the median. Classes are marked from 1 to 4, and a higher number means a group of a higher level of development. The Counties where the PRIZEFISH Project is implemented are more developed than the average. According to the DI, Istria County is in the highest, 4th class, and Zadar County has a slightly lower DI, and so it is in the 3rd class.

Local administration units (municipalities and cities) are classified into 8 classes according to the same DI: 4 classes below and 4 above the median DI. The cities of Pula (Istria County) and Zadar (Zadar County) are both in the highest, 8th grade according to the DI.

Regarding the regional GDP and GVA indicators, data are available up to the NUTS-3 territorial level, that is, counties. Data on GDP by counties are available in the total amount, and data on GVA are available in the total amount and by activities at the 1st NACE level (sections). The highest GDP per capita among 21 Croatian counties was in 2017 in the City of Zagreb, at HRK 155,541 (around EUR 21,000). The Istria County is second with GDP per capita HRK 110,906, and Zadar County is seventh (GDP per capita HRK 73,601). According to this indicator, Istria County is above the national average, and Zadar County is below, but both are ranked above the median for 21 counties (HRK 68,282).

The County of Istria is the fourth of 21 counties in terms of GVA size and participates with 6.3% in the total GVA of Croatia. Zadar County is eighth and generates 3.4% of the national GVA. There is a significant difference in the structure of the County GVAs by activities. In Zadar County, GVA from NACE section A has a share of 5.3%, which is 4.1 times more than in Istria County (1.3%) and 1.5 times more than in Croatia (3.6%). Considering that fishing generates about 9% of GVA NACE section A in Croatia, we can estimate that the share of fisheries in GVA of Istria County is 0.12%, and GVA of Zadar County is 0.48%. The estimate for Zadar County is at the national average, while it is below the average for County of Istria, meaning that in the latter county fishery is less important.

---

<sup>2</sup> DI is a compound indicator of development according to which regional and local government units in Croatia are divided into classes according to the level of development. In calculating the index, the following are taken into account: average per capita income, average local budget revenue per capita, average unemployment rate, general population development, educational level of the population (tertiary education) and the aging index.



## 2.1.2 Employment

The importance of fisheries for income and employment can be observed through data on salaries and the number of employees in this sector. According to EUROSTAT, in 2018, 4,870 people were employed in the Fishery NACE division in Croatia. This is 4.70% of the employed in NACE section A, that is, 0.30% of total employed in Croatia. The average share of fisheries in total employment in the EU-28 is 3.7 times lower than in Croatia (0.08%). The proportion of the employed in Croatian fisheries decreased in the period from 2011 to 2019 from 0.70% to 0.29%.

A high share of self-employment is characteristic in agriculture, forestry and fishing. The share of the self-employed among the total number of employed in Croatia in 2018 was 13%, while that share in the fishing industry was 66%. However, there has been a notable decline in the share of the self-employed over the years, as, in 2009 it was 87%. Same as in NACE section A, and self-employment has a declining trend in the entire Croatian economy (EUROSTAT).

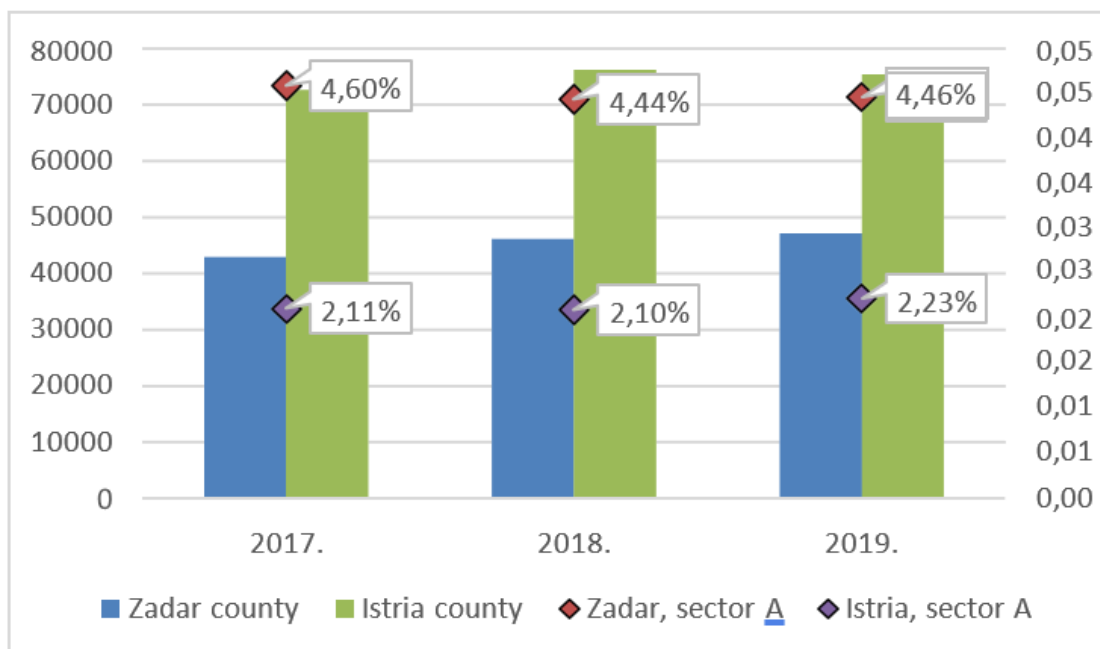
Data on employment on county levels and by activities in Croatia can be obtained from two national statistical sources:

- Central Bureau of Statistics (CBS) and
- The Croatian Pension Insurance Institute (HZMO).

Experts often prefer HZMO data because they not only include people with an employment contract but also all people in companies that have pension insurance (including business owners). HZMO data provide insight into the number of insured persons by areas of activity and by type of business entity (legal and natural persons).

At the end of 2020, there was a total of 1,545,566 insured persons in the HZMO database, which is more than the number of employed according to CBS data. In NACE section A is 3.70% of these persons, and 0.33% (5,161) of them are in the division Fishery.

At the county level, data are only available at the level of activity sections, that is, at the first level of the NACE nomenclature. The number of insured persons in the County of Istria on 30th November, 2020 was a total of 86,293, of which NACE section A 2,862 or 3.32%. There is a total of 55,464 insured persons in Zadar County, of which 3,311 or 5.97% in NACE section A.

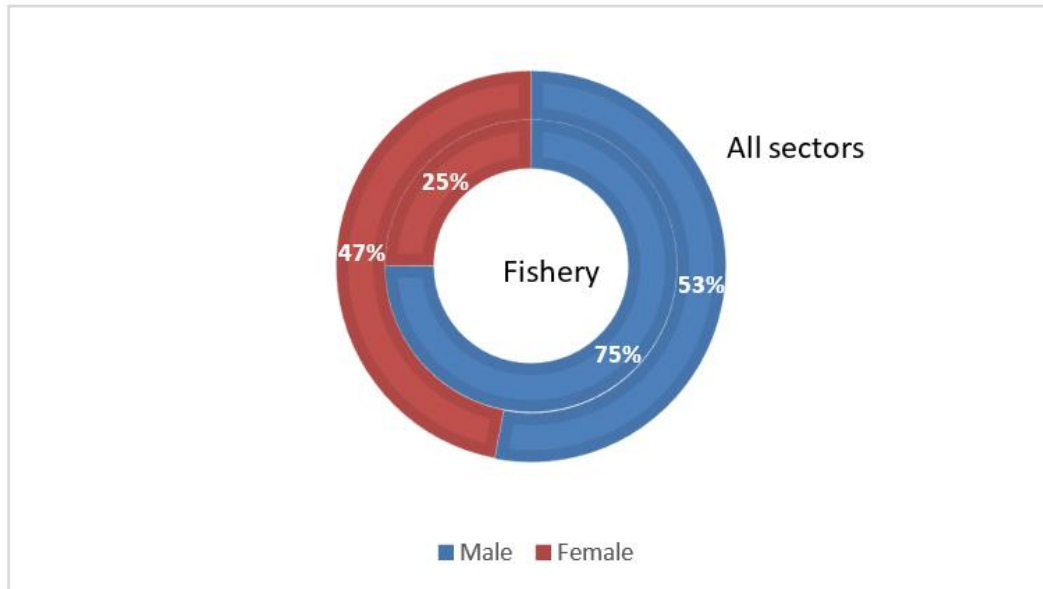


**Figure 2. Number of insured persons of the Croatian Pension Insurance Institute in Istria and Zadar County and the share of the number of insured persons from activity A Agriculture, forestry and fishing 2017-2019, situation as on 30/Nov.**

Source: CBS

If we look only at CBS data of persons with the status of employees, at the end of March 2019, there were 1,338,758 employed in Croatia, of which 2.2% in NACE section A (CBS). Total employment in Istria County was 75,462 persons, and in the County of Zadar 47,226 persons, while the share of Sector A was, respectively, 2.23% and 4.46% (Graph 2). The shares of agriculture, forestry and fisheries are lower compared to HZMO data because the practice of formal employment in this sector is lower than in the economy in general.

Regarding the structure of employed by gender, the share of men in Fisheries and Aquaculture is 75%, which is 22 percentage points more than at the level of the whole economy (Graph 3).



**Figure 3. Structure of insured persons by gender in total and in the fisheries sector, 11/2020**

Source: CBS and The Croatian Pension Insurance Institute

In addition, fishing, as well as agriculture, is characterized by a higher proportion of employed in enterprises such as crafts, trades and freelances. While the proportion of employees in these types of enterprises for all sectors is 14%, in NACE section A it is 28%. This means that in this sector the share of employees in legal entities is smaller, as well as that companies with legal entity are significantly less represented in this sector than in other sectors.

The rate of registered unemployment in Croatia has been falling in the last few years and in 2019 it was 9.1% (-2% in the period 2018-2019). There are large differences between regions, so that unemployment rates by counties range from 3.7% (City of Zagreb) to 19.9% (Sisak-Moslavina) (CBS). In 2019, the County of Istria had an almost twice lower unemployment rate (4.6%) than the national average, while unemployment in the County of Zadar was at the level of the national average (9.2%).

### 2.1.3 Employee benefits

Total compensation to employees in the fishery sector accounts for 0.24% of the total amount of compensation of employed in Croatia (EUROSTAT). Keeping in mind that, according to the same source, there is 0.30% of the total number of employed in the fisheries, we can conclude that the average compensations in fisheries are lower than the average for all employed. Dividing the total compensation to the employed for the entire economy by the number of all employed, we get the value of compensation of EUR 13,529 in Croatia in 2018, which is about EUR 11,000 less compared to the EU-28 average. In the Croatian fisheries sector, compensation per employee was EUR 8,994, and in the EU-28 EUR 13,531 in the same year. It is clear that the average compensation of the employed in Croatia is significantly lower than the EU average, both in fisheries and in the economy as a whole. Also, compensation per employee in fisheries lags behind the same at the level of the whole economy.

Croatian CBS publish data on average monthly net earnings of persons in employment in Croatia. Based on these data, we can realise that net salaries in Croatia are growing in the period from 2016 to 2018. In 2018, the average monthly net salary was HRK 6,164, which gives an amount of around EUR 9,862 on an annual basis. Average net salaries in NACE section A, as well as in the fishery, are about 10% lower than the total average. Data on salaries by counties are available for 2017. The average monthly net salary in the County of Istria was HRK 5,911, and in the County of Zadar HRK 5,571. It should be noted that in 2017, salaries in NACE section A in Istria County are lower than the county average, while in Zadar County they are at the level of the county average. This is possibly because the average monthly net salary in Zadar County is 5.27% lower than in Istria County.

#### 2.1.4 Business data of entrepreneurs

##### *EXPLANATORY NOTE*

*In Croatia, we distinguish two groups of business entities with regard to the obligation to pay business tax, as follows:*

- 1. profit taxpayers and*
- 2. income taxpayers.*

*The first group includes all business enterprises registered as legal entities, and these are by far for the most part companies (incorporate partnerships and capital limited companies). According to the Accounting Act (OG 78/15, 134/15 and 120/16) and the Ordinance on the structure and content of annual financial statements (OG 95/16), these entities are obliged to submit their annual financial reports to the Tax Administration and the Financial Agency (FINA). Income taxpayers can also be entrepreneurs in the capacity of a natural person, at their own decision or if they exceed the income threshold above which they must enter the income tax system. The second group includes business entities as natural persons. They are not required to prepare or submit annual financial reports but only an annual income tax return.*

*Due to this division and rules of financial reporting for a large number of business entities in Croatia, there are no data on basic business indicators. Therefore, the following analysis covers only companies from the first group, that is, those that are required to prepare and submit financial reports. This means that all indicators in this chapter refer to corporate taxpayers and give only a rough picture of the state of the entire population of business entities in the economy or in individual sectors.*

Data on the total number of enterprises, assets, revenues, profits and the number of employed persons for the entire economy were taken from the publication Financial results of Entrepreneurs by Counties (HGK, 2019). Data for NACE sections, divisions and groups were taken from the business reporting database Boniteti.hr (BISNODE). After a short decline in 2016, the number of active businesses in Croatia is growing in 2016-2018, both in Croatia and in the two observed counties. The growth in the number of entrepreneurs is recorded both at the level of the whole economy and at the level of NACE section A (DZS, Register).

The share of enterprises that submit financial reports in the total number of active business entities confirms the fact that in fishery and fishing entrepreneurs are less likely to register their business as a legal entity than in the economy in general. While the share of those who submit financial reports in the economy is 38.55%, in fishery this share is 14.68%, and among marine fishing enterprises 10.87%. **In**

**Zadar County, 19.4% of fishing enterprises submit financial reports, compared to 9.3% in Istria County. Differences in percentages for sea fishing between counties confirm the fact that in the area of Zadar the average fishing company is larger than in the area of Istria, since larger enterprises are subject to profit tax and are required to submit financial reports.**

In 2018, average enterprise in Croatia was employing 7 people and generated an average of HRK 5.7 MM in revenue using assets with an average value of HRK 8.2 MM. In the same year, marine fishing enterprises have on average HRK 4.9 MM of assets and HRK 3.9 MM of revenue with 9 employees per enterprise. Fishing enterprises with financial statements in Zadar County are more numerous and have a higher value of assets (average HRK 6.3 MM) than in Istria County (average HRK 5.0 MM). However, in terms of average income per company, there are no significant differences among enterprises in marine fishing in these counties. The situation in the fisheries sector, which includes aquaculture, is more favorable. Companies are higher than the national average in terms of assets, income and number of employees.

The differences between two counties are smaller than expected knowing that some of the largest fishing enterprises are from Zadar County. The reason is one enterprise in Istria County which conditions the average. This enterprise is the only one from the medium-sized enterprises group of (the others are small) and employs 50% of total employed in sea fishing of the county. If we exclude this company/enterprise from the analysis, the number of employees per enterprise in the County of Istria drops to 4. The average assets of the enterprise are lower by 54%, and income per enterprise is lower by 49%!

**Table 1. Main business indicators of trade enterprises in Croatia, County of Istria, and County of Zadar in 2018**

Sector of economy	Active enterprises, total	Business reporting active enterprises		Values per enterprise			
		Number	% in active enterprises	Assets, HRK '000	Revenues, HRK '000	Net profit, HRK '000	Employees
All sectors of economy							
Croatia	340,163	131,117	38.55%	8,235	5,729	215	7
Istria	26,126	11,006	42.13%	6,610	3,164	138	5
Zadar	13,860	4,755	34.31%	5,765	3,154	94	5
Istria+Zadar	39,986	15,761	39.42%	6,355	3,161	125	5
NACE section A 03 Fishery							
Croatia	2,044	300	14.68%	12,111	6,457	182	10
Istria	486	51	10.49%	5,209	4,239	69	8
Zadar	311	79	25.40%	28,876	13,591	437	17
Istria+Zadar	797	130	16.31%	19,591	9,922	292	14
NACE section A 03.11 Sea fishing							
Croatia	1,859	202	10.87%	4,866	3,858	159	9
Istria	475	44	9.26%	4,959	4,820	31	10
Zadar	273	53	19.41%	6,301	4,581	340	10
Istria+Zadar	748	97	12.97%	5,692	4,689	200	10

Source: BISNODE, Boniteti.hr.

Due to the mentioned enterprise, which stands out in terms of business characteristics, the variability of indicators for companies in sea fishing is significantly higher in the County of Istria than in the County of Zadar (Table 2).

**Table 2. Coefficients of variation (CV) for selected business performance indicators in the sea fishing sector**

Territory	Assets, HRK '000	Revenues, HRK '000	Net profit, HRK '000	Employees
Croatia	2.57	3.00	4.95	2.78
Istria	3.65	3.37	23.85	3.70
Zadar	1.65	2.26	3.59	1.51

Source: BISNODE, Boniteti.hr.

Enterprises in the marine fishing sector account for 1.42% of the total number of enterprises in Croatia (Table 3). This proportion is 3.04 times higher in Istria and 4.04 times in Zadar County than in Croatia. Regarding the share of marine fishing enterprises in the total value of assets and revenues, there are very strong differences between Zadar and Istria counties. Fishing enterprises in Zadar County are larger on average, so that they participate in the total assets of all county enterprises with 1.22%, and in total revenues with 1.62%, which are a few times higher shares than for Croatia and Istria County (Table 3).

**Table 3. A proportion of sea fishing sectors in the total economy of Croatia, County of Istria, and County of Zadar in 2018**

	Business reporting enterprises	Assets	Revenues	Net profit	Employees
NKD section A 03.11 Sea fishing					
Croatia	1.42%	0.09%	0.10%	0.11%	0.19%
Istria County	4.32%	0.30%	0.61%	0.09%	0.79%
Zadar County	5.74%	1.22%	1.62%	4.02%	2.04%
Istria+Zadar	4.75%	0.55%	0.91%	0.98%	1.19%

Source: BISNODE, Boniteti.hr.



Revenue or turnover per employee in Croatian sea fishing (HRK 446,040) is lower than the revenue per employee in the fishery division (HRK 627,940) and the whole economy (HRK 799,150). At the county level, revenues per employee are uniform, despite the fact that Zadar's fishing enterprises are generally higher. The picture changes if we remove the largest enterprise in the County of Istria from the analysis. In that case, the income per employee for Istrian fishing enterprises is HRK 564,372, which is more than in Zadar County. The reason for this is the large number of small fishermen in the County of Istria who have no employees or very few employees.

**Table 4. Business ratios of trade companies in Croatia, County of Istria, and County of Zadar in 2018**

	Revenues per employee, HRK '000	Return on Assets	Profit margin
All sectors of economy			
Croatia	799.15	2.62%	3.76%
Istria County	645.40	2.09%	4.37%
Zadar County	586.15	1.64%	2.99%
Istria+Zadar	626.34	1.97%	3.95%
A 03 Fishery (Fishing and aquaculture)			
Croatia	627.94	1.50%	2.81%
Istria County	499.33	1.32%	1.63%
Zadar County	790.61	1.51%	3.21%
Istria+Zadar	720.19	1.49%	2.95%
A 03.11 Sea fishing			
Croatia	446.04	3.27%	4.13%
Istria County	496.70 (564.37) <sup>+</sup>	0.62% (5.32%) <sup>+</sup>	0.63% (4.96%) <sup>+</sup>
Zadar County	465.09	5.40%	7.43%
Istria+Zadar	479.32	3.51%	4.26%

+ Indicators in brackets were calculated without the largest enterprise in the Istrian County, which made a significant loss in 2018.

Source: BISNODE, Boniteti.hr, Activities according to NKD 2007.

In 2018, Croatian enterprises in sea fishing had a return on total assets (RoA) of 3.27%, which is 0.65 percentage points more than the average for the entire economy (2.62%). The average RoA in fishing is also higher than the average for the entire fishery division, in which assets per company are 2.5 times higher. The sea fishing sector also achieved a higher profit margin (4.13%) than the average profit margin of the economy (3.76%). At the county level, RoA and the profit margin in sea fishing differ markedly. The reason for this is the large impact of the loss made by the largest company in the County of Istria. If we exclude this enterprise from the analysis, the indicators by counties are much more similar, although the average profit margin is still higher in Zadar County.

## 2.2 FISHING FLEET

Croatia has aligned its fishing capacity with available resources in line with Article 22 of Regulation (EU) No 1380/2013. The limit on the size of the fishing fleet in Croatia was set with the EU accession in 2013. The total maximum capacity was 53,452 GT, and power 426,064 kW. By reducing fishing activities under the EFF, the maximum capacity has been further reduced to 48,759 GT and 405,211 kW by the end of 2018. Fleet management is based on a combination of capacity management in the context of continuous reduction of activities with the support of the EMFF, taking into account the relationship between fishing capacity and opportunities offered in tuna farming. Additionally, a number of measures prescribed by national legislation are in place (Ministry of Agriculture 2019).

### 2.2.1 Number of vessels

Data on the total number of vessels vary depending on the source. According to CBS, the total number of vessels in the Croatian fishing fleet in 2018 was 7,573, according to the Scientific, Technical and Economic Committee for Fisheries (STECF, 2020) there were 7,731 vessels, and according to the annual report of the Ministry of Agriculture (2019) the number was 7,174. In this analysis, we used and combined all three sources, with statistical data from the web portal of the Directorate of Fisheries of the Ministry of Agriculture. Data from the web portal allows an overview by regions, i.e. regional units (RU) Pula and Zadar, which is important for assessing the situation in the PRIZEFISH project areas.

The Croatian fishing fleet increased by 55 vessels from 2017 to 2019 (CBS). In the same period, the power of the vessel's propulsion machine was reduced from 47.1 kW to 45.7 kW per vessel. The total size of all vessels in 2019 was 44,514 GT, or 5.87 GT per vessel (CBS). The STECF (2020) report states that

the number of vessels in 2018 decreased by 7% compared to 2017, while the size of the fleet in GT and the total power of vessels decreased at the same time by 9% and 10% respectively.

**Table 5. Fishing fleet in the Republic of Croatia and in Regional Units Pula and Zadar**

	Indicator value			Relative value of indicator		
	2017	2018	2019	2017	2018	2019
Number of vessels				Shares of regional units in total		
Croatia	7,559	7,573	7,614	100.00%	100.00%	100.00%
RU Pula	1,045	1,028	1,025	13.82%	13.57%	13.46%
RU Zadar	1,679	1,475	1,479	22.21%	19.48%	19.42%
Total power of the vessel's propulsion machine, kW				kW per vessel		
Croatia	355,794	348,837	348,126	47.07	46.06	45.72
RU Pula	79,846	76,774	74,994	76.41	74.68	73.16
RU Zadar	85,088	76,584	74,650	50.68	51.92	50.47
Vessel capacity, GT				GT per vessel		
Croatia	45,601	44,439	44,514	6.03	5.87	5.85
RU Pula	7,285	7,072	6,968	6.97	6.88	6.80
RU Zadar	14,293	13,040	12,831	8.51	8.84	8.68

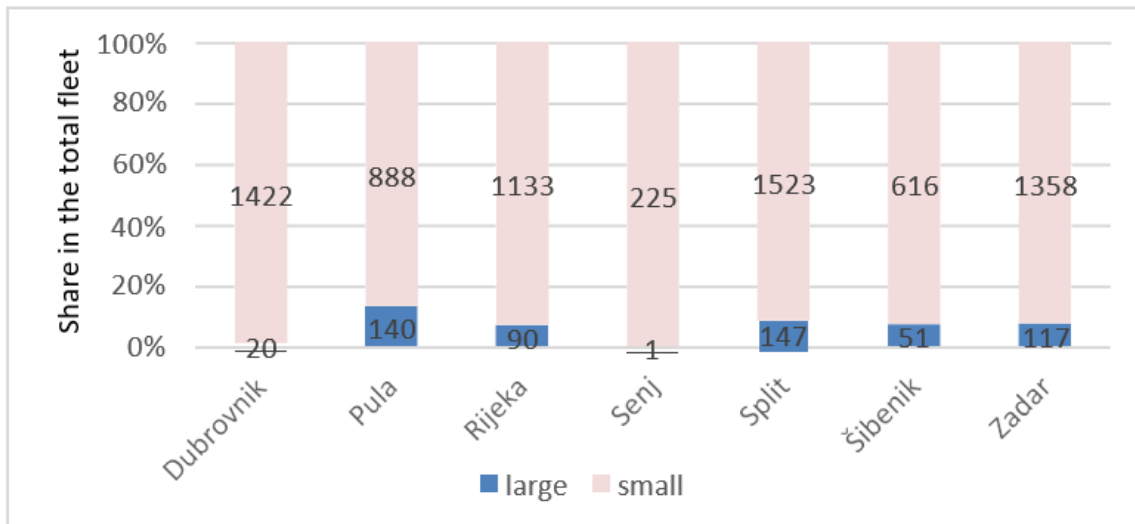
Source: CBS (Croatia) and the Ministry of Agriculture, Directorate of Fisheries.

In 2019, 19.4% of all vessels of the national fleet were in the RU Zadar, and 13.5% in the RU Pula. The share of the RU Pula is relatively stable, while the share of Zadar decreased slightly from 2017 to 2019.

In the RU Pula in 2019, the power of the propulsion machine per vessel was higher (73.2 kW) compared to the entire fleet and the RU Zadar (45.7 kW; ≈50.5 kW, respectively). However, in the RU Zadar, the tonnage per vessel (8.68 GT) is higher than at the level of Croatia (5.85 GT) and the RU Pula (6.8 GT).

In 2018, the Croatian fishing fleet in the largest part consisted of small vessels (93%) from the segments VL0006 (55%) and VL0612 (38%) (Ministry of Agriculture, 2019). Only 7% of vessels (566 of them) entered the group of large vessels (12-40 m). Within the group of large vessels, most of them are in the

smaller segment VL1218 (59%), and the shares of the segments VL1824 and VL2440 are equal (about 20% of large vessels each).



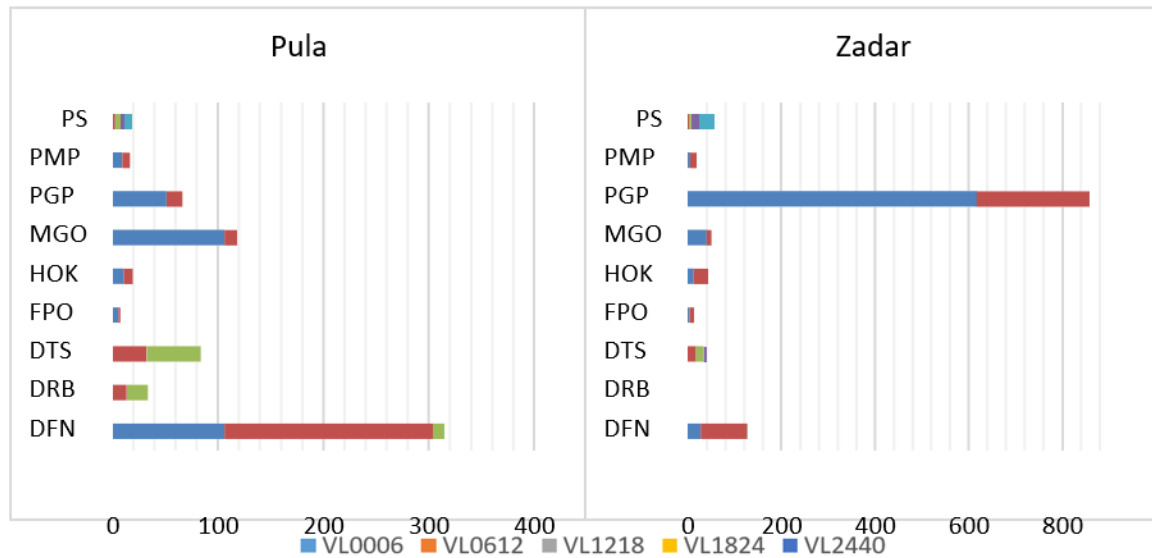
**Figure 4. Share of groups of small and large vessels by length in the Croatian fleet in 2018**

Note: small=VL0006+VL0612, large=VL1218+VL1824+VL2440

Source: Ministry of Agriculture, Directorate of Fisheries.

Although the share of vessels from the VL1824 and VL2440 segments in the RU Zadar is the highest, the RU Pula has the largest share of large vessels group. This is due to the highest share of the VL1218 segment (11.6%) which enters the group of large ones. The first next regional unit ranked according to this share is Šibenik with half of the Pula percentage (5.6%). We should also mention that in the VL2440 segment, the RU Pula has 13, and Zadar 43 purse seine vessels (PS).

In Graph 5, we can easily see differences between the regional units of Pula and Zadar with regard to the structure of the fishing fleet by length of vessel and fishing technique in 2018. We see that in Pula vessels with drifted or fixed nets (DFN) predominate, while in the area of Zadar the most numerous vessels are only with polyvalent passive tools (PGP). We also notice a significantly higher number of fishers with other mobile gears (MGO) in the area of Pula, and purse seines (PS) in the area of Zadar.



**Figure 5. Fishing fleet by vessel length and fishing technique**

Note: Inactive vessels are not included.

Source: Ministry of Agriculture, Directorate of Fisheries.

In the entire fishing fleet, small vessels in the PGP segment are by far the most numerous, followed by vessels in the DFN segment, which are also small (VL0006 and VL0612). Dredges are the least represented (DRB, a total of 33), of which all are in the area of Pula. Pula is also characterized by a very high percentage of vessels that were not active at the time of data collection. The percentage of inactive vessels in the RU Pula was 34.24% in 2018 and is the highest among the Croatian regional units.

### 2.2.2 Basic characteristics of fishing fleet vessels by regional units

Tables 6 and 7 provide a detailed overview of the basic indicators of the fishing fleet in Croatia and in the regional units of project implementation with regard to the length of the vessel and fishing technique.

**Table 6. Main indicators of the fleet by vessel length in Croatia and regional units Pula and Zadar in 2018**

Region	Segments by vessel length	Number of vessels	Total power, kW	Total GT	Length by vessel, LoA, m	Share in no. of vessels
Pula	VL0006	446	6,156	409	4.75	26.0%
Pula	VL0612	442	41,319	2,135	8.62	46.9%
Pula	VL1218	119	20,010	1,957	14.05	20.6%
Pula	VL1824	8	2,395	590	20.40	2.0%
Pula	VL2440	13	6,894	1,982	28.35	4.5%
<b>Pula</b>	<b>Total</b>	<b>1,028</b>	<b>76,774</b>	<b>7,072</b>	<b>7.91</b>	<b>100.00%</b>
Zadar	VL0006	803	6,763	786	4.86	36.6%
Zadar	VL0612	555	26,404	1,731	7.55	39.3%
Zadar	VL1218	40	7,121	679	14.52	5.4%
Zadar	VL1824	31	9,315	2,213	20.99	6.1%
Zadar	VL2440	46	26,981	7,631	29.10	12.5%
<b>Zadar</b>	<b>Total</b>	<b>1,475</b>	<b>76,584</b>	<b>13,040</b>	<b>7.23</b>	<b>100.00%</b>
Croatia	VL0006	4,278	39,156	3,890	4.75	38.1%
Croatia	VL0612	2,887	173,847	10,430	7.79	42.2%
Croatia	VL1218	340	54,031	6,121	14.37	9.2%
Croatia	VL1824	111	32,521	7,649	20.64	4.3%
Croatia	VL2440	115	61,328	17,958	28.55	6.2%
<b>Croatia</b>	<b>Total</b>	<b>7,731</b>	<b>360,883</b>	<b>46,049</b>	<b>6.89</b>	<b>100.00%</b>

Source: Ministry of Agriculture, Directorate of Fisheries.

**Table 7. Basic data on the fleet by fishing technique in Croatia and regional units of Pula and Zadar in 2018**

Region	Fishing technique	Number of vessels	Total power, kW	Total GT	Length per vessel, LoA, m	Average age, year	Share in total no. of vessels
Pula	DFN	315	22,822	1,159	7	33	30.6%
Pula	DRB	33	4,943	385	13	35	3.2%
Pula	DTS	83	12,217	1,169	13	35	8.1%
Pula	FPO	7	413	15	6	25	0.7%
Pula	HOK	19	1,939	65	7	22	1.8%
Pula	MGO	118	2,928	124	5	27	11.5%
Pula	PGP	66	1,421	78	5	38	6.4%
Pula	PMP	16	792	47	6	25	1.6%
Pula	PS	19	6,612	1,727	21	35	1.8%
Pula	INA	352	22,686	2,304	8	38	34.2%
<b>Pula</b>	<b>Total</b>	<b>1,028</b>	<b>76,774</b>	<b>7,072</b>	<b>8</b>	<b>34</b>	<b>100.0%</b>
Zadar	DFN	129	5,280	390	7	36	8.7%
Zadar	DRB	-	-	-	-	-	0.0%
Zadar	DTS	40	4,908	746	14	48	2.7%
Zadar	FPO	14	662	29	7	26	0.9%
Zadar	HOK	44	4,634	156	7	37	3.0%
Zadar	MGO	51	1,466	78	5	23	3.5%
Zadar	PGP	859	8,906	1,096	5	39	58.2%
Zadar	PMP	19	903	65	8	34	1.3%
Zadar	PS	57	28,412	7,241	25	36	3.9%
Zadar	INA	262	21,413	3,240	9	40	17.8%
<b>Zadar</b>	<b>Total</b>	<b>1,475</b>	<b>76,584</b>	<b>13,040</b>	<b>7</b>	<b>38</b>	<b>100.0%</b>
Croatia	DFN	1,008	50,937	2,998	7	36	13.0%
Croatia	DRB	33	4,943	385	13	35	0.4%
Croatia	DTS	333	50,119	7,249	14	40	4.3%
Croatia	FPO	158	7,305	354	7	33	2.0%
Croatia	HOK	319	28,081	1,139	7	32	4.1%
Croatia	MGO	345	11,304	546	5	27	4.5%
Croatia	PGP	3,610	36,208	4,239	5	39	46.7%
Croatia	PMP	87	4,279	216	7	32	1.1%
Croatia	PS	166	60,253	14,756	21	38	2.1%
Croatia	INA	1,672	107,453	14,167	8	40	21.6%

Croatia	Total	7,731	360,883	46,049	7	38	100.0%
---------	-------	-------	---------	--------	---	----	--------

Source: Ministry of Agriculture, Directorate of Fisheries.

## 2.3 CATCH IN MARINE FISHING

In 2019, majority of production in Croatian fishery (79%) was realized from marine fishing, and the remaining part is aquaculture in which mariculture predominates. Commercial fishing in Croatia is reduced to sea fishing, because freshwater fishing is of marginal commercial importance. Around 97% of the total catch in sea fishing is fish, and the rest are crabs, shellfish and cephalopods. The total catch decreases in the period 2016-2019 at an average annual rate of -4.19%, while the rate of change for the quantities of fish caught is -3.95%. According to CBS, the amount of fish caught decreased from 69,933 T in 2016 to 61,824 T in 2019 (Table 8).

**Table 8. Catch of sea fish, crabs, shellfish and cephalopods in tonnes**

	2016	2017	2018	2019	Average annual rate of change
TOTAL	72,794	69,534	69,831	63,883	-4.19%
Fish, total	69,933	67,020	67,513	61,824	-3.95%
Pelagic fish	66,349	63,177	63,814	58,010	-4.29%
European pilchard	54,412	48,420	46,267	45,134	-5.97%
European anchovy	8,239	10,884	13,251	7,995	4.73%
Tuna	516	631	679	822	16.98%
Other fish	3,584	3,843	3,699	3,814	2.20%
Crabs, shellfish and cephalopods	2,861	2,514	2,318	2,059	-10.37%

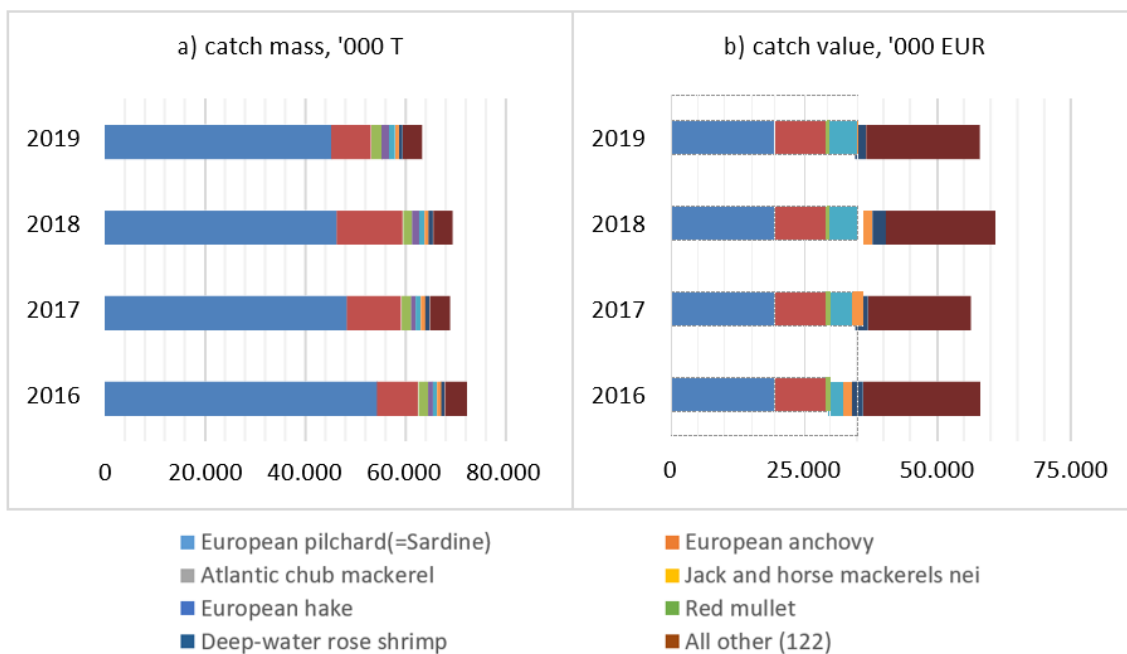
Source: CBS, Databases

In the total amount of fish caught, small pelagic fish has a proportion of nearly 94%. As for particular species of pelagic fish, the most common is European pilchard or Sardine, which makes up 72.5% -77.8%



of pelagic fish caught. The rest is accounted for by European anchovy (13.8% -20.8%) and tuna (1.0% - 1.4%).

The database of Scientific, Technical and Economic Committee for Fisheries (STECF, <https://stecf.jrc.ec.europa.eu/>) provides insight into the quantity and value of catches by species at national level for all EU Member States. Their data are based on data on the fleet, catches and socio-economic characteristics of fishermen collected by the competent national institutions and bodies. The structure of total landings according to this source is in line with national statistics in terms of quantities. Although the landing of European pilchard and European anchovies has been declining in volume since 2016, it still accounts for the majority of landings in 2019 with a share of 84%. If we add to the landing of these two species the quantities for five more species (Atlantic chub mackerel, Jack and horse mackerels nei, European hake, Red mullet and Deep-water rose shrimp), together they make up over 94% of the total landings.



**Figure 6. Structure of landings by quantity and value for main species of fish and other marine organisms in Croatia 2016-2019**

Source: STECF, 2020

The structure of the value of landings by species is significantly different due to differences in unit prices of different species. Given that the selling prices of European pilchard and European anchovies is significantly lower than the prices of some marine organisms caught in smaller quantities, the share of these two species in the total value of landings is significantly lower than the share in quantity and amounts to 47%. A group of all other species not specifically listed in Graph 6 also has a high share in the value of landings (37%). According to the value of landing by species, European pilchard and European anchovy are followed by European hake, Deep- water rose shrimp and Red mullet.

**Table 9. Quantity of landings in Croatian sea fishing by main species 2016-2019**

Species name	T, thousands				Species share in total value			
	2016	2017	2018	2019	2016	2017	2018	2019
European pilchard	54,368	48,333	46,267	45,141	75.2%	70.2%	66.7%	71.4%
European anchovy	8,236	10,880	13,251	7,995	11.4%	15.8%	19.1%	12.6%
Atlantic chub mackerel	1,866	1,945	1,807	2,114	2.6%	2.8%	2.6%	3.3%
Jack and horse mackerel nei	988	915	1,463	1,566	1.4%	1.3%	2.1%	2.5%
European hake	753	928	992	1,133	1.0%	1.3%	1.4%	1.8%
Red mullet	973	1,001	842	746	1.3%	1.5%	1.2%	1.2%
Deep-water rose shrimp	655	834	913	715	0.9%	1.2%	1.3%	1.1%
All other (122)	4,485	4,036	3,867	3,853	6.2%	5.9%	5.6%	6.1%
Total	72,324	68,875	69,401	63,264	100.0%	100.0%	100.0%	100.0%

Source: STECF, 2020

**Table 10. Value of landings in Croatian sea fishing by main species 2016-2019**

Species name	Value, EUR thousands				Species share in the total value			
	2016	2017	2018	2019	2016	2017	2018	2019
European pilchard	20,777	18,197	19,528	20,051	35.8%	32.3%	32.1%	34.6%
European anchovy	7,785	10,027	11,487	7,262	13.4%	17.8%	18.9%	12.5%
Atlantic chub mackerel	691	714	685	844	1.2%	1.3%	1.1%	1.5%
Jack and horse mackerels nei	370	350	557	625	0.6%	0.6%	0.9%	1.1%
European hake	2,769	3,658	3,981	4,414	4.8%	6.5%	6.5%	7.6%
Red mullet	1,673	1,764	1,609	1,438	2.9%	3.1%	2.6%	2.5%
Deep-water rose shrimp	2,004	2,295	2,489	1,974	3.5%	4.1%	4.1%	3.4%
All other (122)	22,005	19,306	20,572	21,408	37.9%	34.3%	33.8%	36.9%
Total	58,074	56,311	60,908	58,015	100.0%	100.0%	100.0%	100.0%

Source: STECF, 2020

### 2.3.1 Landing quantity and value of landing by fleet segments

According to the data of the Directorate of Fisheries at the Ministry of Agriculture of the Republic of Croatia (2019), the total amount of landings of the fishing fleet in 2018 was about 69,000 T, and the value of landings was EUR 61,000,000. Both the quantity and value of landings have been rising slightly since 2017 after a three-year decline that began in 2014. Viewed by vessel length, the large vessel segment, in which only 7% of the fleet is present, has a share of 95.3% in the total amount of landings and 75% in the value of landings (2018). Individually by segments, the largest contribution to the amount of landing is given by the segment VL2440 with 55% of the total landing.

The fleet from the RU Zadar participates with 46% in the quantity of fish landings and with 31% in the value of landings in Croatia. The shares of Pula are 12% and 16% respectively. In the area of Zadar, the share of large vessels in the total quantity of landings is 99%, and in the area of Pula 90%. Landings of large vessels from the Zadar area accounts for 48% of the total landings of large vessels in Croatia.

Landings per vessel in the group of large was 51,680 kg in the RU Pula and 269,050 kg in the RU Zadar. In the group of small vessels, the landings per vessel in the RU Pula was 880 kg, and in RU Zadar 300 kg. The differences between regional units according to the value of landings are even greater, because the share of large vessels in the area of Zadar in the value of landings is 89%, and in the area of Pula 57%. Landing data clearly show the above-average domination of a group of large vessels of the RU Zadar in the Croatian maritime Fisheries.

**Table 11. Catch of sea fish by classes according to the vessel length in Croatia and the regional units Pula and Zadar in 2018**

RU and length group	Number of vessels	Landing, quantity			Landing value		
		Tonnes	Size group in total	Per vessel, T	HRK Thousand	Size group in total	Per vessel, HRK thous.
<b>Pula</b>							
Large	140	7,235	90.3%	51,68	41,852	57.2%	298,94
Small	888	779	9.7%	0,88	31,348	42.8%	35,30
Total	1,028	8,014	100.0%	7,80	73,200	100.0%	71,21
<b>Zadar</b>							
Large	117	31,479	98.7%	269,05	124,970	89.3%	1.068,12
Small	1,358	404	1.3%	0,30	14,977	10.7%	11,03
Total	1,475	31,884	100.0%	21,62	139,947	100.0%	94,88
<b>Croatia</b>							
Large	566	66,140	95.3%	116,85	339,722	75.3%	600,22
Small	7,165	3,261	4.7%	0,46	111,574	24.7%	15,57
Total	7,731	69,401	100.0%	8,98	451,296	100.0%	58,37

Note: Quantities and value of catch according to the fishermen catch documentation.

Source: Ministry of Agriculture, Directorate of Fisheries.

The results of the analysis of catches in 2018 by types of fishing techniques are related to the size or length of the vessel. By far the largest share in the amount of catch have purse seiners who are in the group of large vessels. In RU Istria, 82% of the catch comes from them, and in the area of Zadar 98%.

The share of purse seiners is higher in the RU Zadar because there are more of them and they have higher capacities than in the RU Pula, which we see from the data per vessel. In addition to purse seines, in the RU Pula, demersal trawlers and/or demersal seiners (DTS) and dredgers (DRB) have a significant share in the amount of catch. In the RU Zadar, all other fishing techniques or gears except purse seine have a share in the amount of less than 1% each. The situation is somewhat different in terms of landing value. There, the shares of purse seiners are lower due to lower unit prices of their catch. In the value of catches in the RU Pula, the highest percentages are held by purse seiners (30%), DTS vessels (25%) and DFN vessels (23%). In the RU Zadar, purse seiners in 2018 have an 85% share in the value of the catch, in second place are DFN vessels with 6%, and in third place DTS vessels with 5%.

**Table 12. Catch of sea fish by types of fishing gear in Croatia and regional units of Pula and Zadar in 2018**

Fishing technique	Number of vessels	Landing weight			Landing value		
		T	Group share in total	T/vessel	'000 HRK	Group share in total	HRK/vessel
<b>Pula</b>							
DFN	315	366	4.6%	1.16	16,774	22,9%	53,250
DRB	33	230	2.9%	6.96	7,338	10,0%	222,366
DTS	83	670	8.4%	8.07	18,315	25,0%	220,663
FPO	7	4	0.0%	0.53	208	0,3%	29,697
HOK	19	11	0.1%	0.59	737	1,0%	38,806
MGO	118	156	1.9%	1.32	6,953	9,5%	58,921
PGP	66	3	0.0%	0.05	112	0,2%	1,703
PMP	16	12	0.1%	0.75	500	0,7%	31,252
PS	19	6,563	81.9%	345.40	22,263	30,4%	1,171,725
INA	352						
Total	1028	8,014	100.0%	7.80	73,200	100,0%	71,206
<b>Zadar</b>							
DFN	129	190	0.6%	1.47	7,796	5,6%	60,431
DRB							
DTS	40	264	0.8%	6.60	7,036	5,0%	175,904
FPO	14	9	0.0%	0.66	564	0,4%	40,318
HOK	44	23	0.1%	0.53	1,290	0,9%	29,327
MGO	51	37	0.1%	0.72	1,750	1,3%	34,311
PGP	859	13	0.0%	0.02	403	0,3%	469
PMP	19	65	0.2%	3.44	1,774	1,3%	93,358
PS	57	31,281	98.1%	548.80	119,315	85,3%	2,093,242
INA	262	0	0.0%	0.00	19	0,0%	73
Total	1,475	31,884	100.0%	21.62	139,947	100,0%	94,879

<b>Croatia</b>							
DFN	1,008	942	1.4%	0.93	40,940	9,1%	40,615
DRB	33	230	0.3%	6.96	7,338	1,6%	222,366
DTS	333	4,168	6.0%	12.52	111,873	24,8%	335,954
FPO	158	88	0.1%	0.56	7,190	1,6%	45,504
HOK	319	325	0.5%	1.02	16,199	3,6%	50,780
MGO	345	534	0.8%	1.55	19,177	4,2%	55,585
PGP	3,610	56	0.1%	0.02	1,891	0,4%	524
PMP	87	113	0.2%	1.30	3,436	0,8%	39,491
PS	166	62,945	90.7%	379.19	243,225	53,9%	1,465,212
INA	1,672	0	0.0%	0.00	27	0,0%	16
<b>Total</b>	<b>7,731</b>	<b>69,401</b>	<b>100.0%</b>	<b>8.98</b>	<b>451,296</b>	<b>100,0%</b>	<b>58,375</b>

Note: Quantities and values of catches according to catch documentation. Source: Ministry of Agriculture, Directorate of Fisheries.

The quantity of landing per vessel in the RU Pula is 7.8 T, and purse seiners have by far the highest average (354 T). In the RU Zadar, the quantity of landing per vessel is almost three times higher than in Istria: 21.62 T. In the Zadar fleet, purse seiners also have the largest catch per vessel which is 548 T.

Quite same relations are valid for the value of landing per vessel, with the difference between the averages for the observed regional units being smaller. Purse seiners in both areas have by far the highest landing value per vessel and have a share in the value of landing of 30.4% in the RU Pula and 85.3% in the RU Zadar. The values among the types of vessels are again more uniform in the RU Pula. For example, the coefficient of variation of revenue per vessel for all types of vessels in the RU Pula is  $CV=1.83$ , and in the RU Zadar  $CV=2.43$ .

### 2.3.2 Fishing days and days at sea

The number of days at sea and the number of fishing days is conditioned by EU and national fishery policy. The cessation of fishing by species and the limitation of the number of days for individual segments of the fleet directly affect the total number of realized fishing days and days at sea of the fleet.

In 2018, the Croatian fishing fleet achieved a total of 213,507 fishing days, which is 28 days per vessel. At the same time, the number of days at sea per vessel is 32. Looking at the length of the vessel (LoA), the

largest number of days was achieved by vessels in class VL0612, and the largest number of fishing days per vessel had those in class VL2440.

**Table 13. Fishing days by vessel length classes in Croatia and regional units Pula and Zadar 2018**

Region and vessel length group	Fishing days, total	Fishing days per vessel	Days at sea per vessel
<b>Pula</b>			
VL0006	20,627	46	54
VL0612	25,264	57	65
VL1218	8,486	71	78
VL1824	460	58	62
VL2440	1,206	93	95
<b>Total</b>	56,043	55	62
<b>Zadar</b>			
VL0006	4,801	6	7
VL0612	13,486	24	32
VL1218	2,383	60	68
VL1824	3,553	115	120
VL2440	5,246	114	118
<b>Total</b>	29,469	20	24
<b>Croatia</b>			
VL0006	54,190	13	16
VL0612	111,989	39	46
VL1218	24,688	73	80
VL1824	10,881	98	104
VL2440	11,759	102	107
<b>Total</b>	213,507	28	32

Source: Ministry of Agriculture, Directories of Fisheries

From the overview by the type of fishing technique (Table 14) we see that the largest share in the total number of fishing days is held by fishermen from the group of drift and/or fixed netters (37%). Four other groups by fishing gear have a share of more than 10%: demersal trawl and demersal seiner (DTS), other mobile gears (MGO), purse seiners (PS) and vessels with pots and traps (FPO).

**Table 14. Fishing days by fishing technique in Croatia and regional units Pula and Zadar 2018**

Region and gear type	Fishing days, total	Fishing days per vessel	Days at sea per vessel
<b>Pula</b>			
DFN	27,808	88	106
DRB	3,258	99	104
DTS	8,147	98	107
FPO	996	142	120
HOK	844	44	49
MGO	11,150	94	103
PGP	447	7	8
PMP	1,072	67	86
PS	2,321	122	127
INA	0	0	0
Total	56,043	55	62
<b>Zadar</b>			
DFN	9,575	74	104
DRB			
DTS	4,033	101	116
FPO	1,701	122	84
HOK	1,622	37	52
MGO	1,874	37	50
PGP	338	0	1
PMP	1,409	74	89
PS	8,917	156	163
INA	0	0	0
Total	29,469	20	24
<b>Hrvatska</b>			
DFN	79,224	79	103
DRB	3,258		104
DTS	35,295	106	117
FPO	21,870	138	102
HOK	15,473	49	64
MGO	24,233	70	83
PGP	4,229	1	2



PMP	6,169	71	87
PS	23,756	143	150
INA	0	0	0
Total	213,507	28	32

Source: Ministry of Agriculture, Directorate for Fisheries

In the RU Istra, the number of fishing days per vessel is as much as 35 days more than in the RU Zadar. This is due to differences in fleet structure with respect to vessel length and type of fishing technique. In RU Istra, a significantly higher number of fishing days per vessel was realized in groups of small vessels, and in RU Zadar the numbers are higher in groups of large vessels.

As far as fishing technique is concerned, in both regional units the largest number of fishing days is realized by drift and/or fixed netters (DFN), but the share of these vessels in RU Pula (50%) is 17 percentage points higher than in the RU Zadar. In the RU Istra a significantly higher share in fishing days than in RU Zadar also have vessels with other active gears and dredgers (the latter are not present in the Zadar unit). On the other hand, the share of purse seiners in the RU Zadar is significantly higher: 30.3% compared to 4.1% in the RU Istra.

As for fishing days per vessel, in RU Istra, most days per vessel have vessels with fish pots and traps (FPO), and in RU Zadar purse seiners. The largest relative differences in the number of fishing days per vessel with regard to fishing gear (excluding vessels with dredges appearing in one RU only) are observed for vessels with polyvalent passive gears (PGP) and vessels with other active gears (MGO). In both cases, the number of fishing days per vessel is significantly higher in RU Pula. There is also a significant difference between regional units for purse seiners, which have a 22% higher number of fishing days per vessel in the RU Zadar than in the RU Istra.

## 2.4 ECONOMIC CHARACTERISTICS OF THE CROATIAN SEA FISHING SECTOR

With a total of 7,731 vessels in 2018, the Croatian fishing fleet was in fifth place in terms of the number of vessels among EU member states with a share of 9.5% (STECF, 2020). However, due to a large share of small vessels, the share of the Croatian fleet in the EU fleet in terms of total vessel tonnage is only 3.0%, and in terms of vessel power 5.9%. Among 23 EU member states with a fishing fleet Croatia is ranked 15th in terms of total landings, and 13th in terms of the value of landings.

According to the main business indicators, the Croatian fleet is ranked between 9th and 15th places. In terms of revenue and gross value added, Croatia is in the 12th place. It has the highest rank in terms of gross profit margin (9th), and the lowest in terms of net profit margin (21st). The difference in the range of these two indicators stems from the high burden on the Croatian fleet of depreciation costs and opportunity costs of capital, which indicates a relatively low efficacy of engaged resources.

**Table 15. Rank of Croatia among 23 fishing fleets of the European Union according to selected socio-economic indicators**

Indicator	Rank of the Croatian Fleet
Number of vessels	5
Quantity of landings	15
Landing value	13
Revenue	12
Gross Value Added	12
Gross profit margin	9
Net Profit	15
Net profit margin	21

Source: STECF, 2020

### 2.4.1 Employees and compensation to employees

In the Croatian fishing fleet in 2018 were engaged 7,820 people, of which about 40% were employed full-time. The trend of the total number of crew members has been growing in the last five years, considering that this growth slowed down in 2018. However, within the employed population, there are positive changes as the number of those employed full-time is continuously increasing at a higher rate than the total number of employed. In other words, the share of people employed full-time in the total engaged crew is increasing. As the growing rate of the engaged crew is higher than the growing rate of the number of vessels, the size of the crew per one vessel increases in terms of the last two and the last five years.

**Table 16. Employment indicators for the Croatian fishing fleet 2016-2018**

Variable name	unit	2016	2017	2018	Δ 2018 to 2017	Δ 2018 to avg. 14-17
Number of vessels	number	7,746	8,349	7,731	-7.40%	7.20%
Engaged crew	number	7,227	7,813	7,820	0.09%	20.72%
Full time employees	number	3,009	3,023	3,122	3.27%	15.05%
Engaged crew/Vessel	number	1	1	1	8.09%	10.49%
Average compensation to staff <sup>+</sup>	EUR	6,944	7,502	8,451	12.65%	18.67%

+ Average compensation = Personnel cost / (Crew members – Unpaid crew members)

Source: STECF, 2020

The estimated amount of compensation to crew members was calculated as the ratio of staff costs to the number of paid crew members. The amount of this fee increased in 2018 compared to 2017 by 12.65%, and compared to the average for the period 2014-2017 by 18.67%. Based on these indicators, we can say that the trend in sea fishing until 2018 was positive from the point of view of employment and the employed.

## 2.4.2 Revenues

The collected socio-economic data on the economic fleet published by STECF indicate positive rates of change for both the values of total landings and total annual income in marine fisheries. In 2018, the total value of landings increased by 6.51% compared to the previous year, and annual revenue increased by 7.95%. It should be noted, that the reason for the difference between the value of landing and total income is the fact that vessels are not used exclusively for fishing, but also for other registered activities from which fishermen earn an income.

**Table 17. Revenue indicators for the Croatian fishing fleet 2016-2018**

Variable name	unit	2016	2017	2018	Δ 2018 to 2017	Δ 2018 to avg. 14-17
Gross value of landings	EUR '000	58,443	55,936	59,579	6.51%	0.45%
Annual revenue	EUR '000	83,834	88,262	95,282	7.95%	11.66%
Annual revenue/ Vessel	EUR	10,823	10,572	12,325	16.6%	-1.6%

Source: STECF, 2020

Annual revenue per vessel increased from 2017 to 2018 by 16.6%, but it is lower than the average for the period 2014-2017. The reason is the above-average high revenue per vessel realized in 2014 (EUR 19,519), after which there is a big drop.

## 2.4.3 Business performance indicators

To review the situation and changes in the area of business performance, we looked at gross value added, gross profit margin and return on physical assets. We have already mentioned in the text that the Croatian fleet is ranked around the middle in terms of gross indicators, while in terms of net indicators it is closer to the end of the list with 23 EU fishing fleets. As it can be seen from Table 18, these indicators in 2018 are significantly higher than the average for the period 2014-2017. The gross profit margin stands out in particular, which is higher by as much as 71.03% because its values in 2015 and 2016 were very low.

**Table 18. Business indicators for the Croatian fishing fleet 2016-2018**

Variable name	unit	2016	2017	2018	Δ 2018 to 2017	Δ 2018 to avg. 14-17
Gross Value Added	EUR '000	30,474	48,476	51,418	6.07%	30.42%
Gross Value Added / Vessel	EUR	3,934	5,806	6,651	14.5%	16.10%
Gross profit margin	%	0.0%	26.2%	25.4%	-2.93%	71.03%
Return on physical assets	%	-5.8%	3.4%	5.4%	57.49%	

Source: STECF, 2020

But at the same time, the stagnation of this indicator in the last two years can be seen. Return on fixed assets was negative in the period from 2014-2016, and then from 2017 it turns into positive values and grows in 2018 by 57.5%.

Given the indicators from the STECF database, it can be generally concluded that the situation in employment and salaries, as well as income and business results of the Croatian fishing fleet is improving during the period from 2015-2018. The fact is that the total number of vessels and catches or landings do not follow these trends, and this is largely the result of fleet size and catch limits established by sustainable fisheries management policies at EU and national level.

## 3. RESULTS OF THE SURVEY

### 3.1 INTRODUCTORY NOTES

The survey of fishermen in areas of Zadar and Pula was conducted in November 2020 in the form of interviews. A structured questionnaire developed as part of this research was used for the interviews. The questionnaire contains 22 questions, some of which have sub-questions. The questionnaire contains 11 open-ended questions and the same number of closed-ended questions. Among the closed-ended questions are three rating scale questions with different ranges. The questions were divided into three groups on the following topics:

- A. Basic data on activity, resources and catch
- B. Sales market and customer preferences
- C. Promotion, certification and PRIZEFISH Project. The questionnaire form is attached to this study as Annex 3.

The survey was conducted through a face-to-face interview on a sample of 45 fishermen. 33 interviews were conducted in Istria and 12 interviews in Zadar. Among the surveyed fishermen in Istria, 22 of them were members of the Istria Fishermen's Cooperative. In the area of Zadar, 8 respondents were members of the cooperative Omega 3.

The greatest number of respondents are fishermen whose activity is registered as a trade or craft (38), and a smaller number of them operate as trade companies, i.e. legal entities (7).

### 3.2 VESSELS

The surveyed fishing enterprises in two thirds of cases use only one vessel. There are 11 fishermen who have two vessels and four of them with three vessels. The structure of respondents according to the number of vessels is the same for the area of Istria and Zadar. In Istria, there is a slightly higher number of fishermen with two vessels among the members of the cooperative compared to non-members. In total, there are fewer fishermen with three vessels among members of cooperatives.

**Table 19. Fishermen by number of active vessels, region and membership in cooperative**

Survey area	Number of active vessels			Total
	1.00	2.00	3.00	
Istria, cooperative members	15	6	1	22
Istria, not in cooperative	7	2	2	11
Zadar, cooperative members	7	1	0	8
Zadar, not in cooperative	1	2	1	4
Total	30	11	4	45

The length of the vessel (LoA) is in the range 3.38-85.28 m, the arithmetic mean is 17.02 m, and the median is 11.95 m. The average vessel length is 3.7 times longer in the Zadar region than in Istria, and the median is 2.8 times higher. The longest vessel in the Zadar region is 85.28 m, and in the Istrian region 17.5 m. Length per vessel at the level of the entire Croatian fleet was 6.98 m, in RU Zadar it was 7.23 m, and in RU Pula 7.91 m in 2019.

The differences among the areas studied are ten times larger in the capacity or tonnage of the vessel. The average for respondents from the area of Zadar is 170.47 GT, and from the area of Istria 7.89 GT. The total average of all survey participants was 51.25 GT, and the total median was 8.00 GT. According to the CBS and the Ministry of Agriculture, the capacity per vessel in 2019 was 5.85 GT in Croatia, 6.80 in Pula and 8.68 in Zadar region. It is evident that the proportion of fishermen with large vessels in the sample from the area of Zadar is significantly higher than in the population.

In terms of the power of the vessel's propulsion engine in kW, the mean values for the respondents from the area of Zadar are also many times higher than for Istria. The arithmetic mean for the Zadar area is 675 kW, and for Istria 115 kW, while the medians are, respectively, 537 and 96 kW. The mean power for all vessels from the survey is 265 kW, and the median is 160 kW. The average power of the vessel's propulsion machine among the surveyed fishermen is significantly higher than the average of the Croatian fleet. Viewed for the entire Croatian fleet, the power of the propulsion machine per vessel in 2019 was 45.7 kW. In the RU Istra, the power per vessel was 73.2 kW, and in the RU Zadar 50.5 kW.

### 3.3 USE OF FISHERY RESOURCES

The surveyed fishermen mostly use their vessels and equipment to earn income from fishing activities. Slightly more than half of the respondents (56%) use resources only for fishing. In the area of Istria, 17 out of 33 fishermen use vessels only for fishing, and in the area of Zadar, none of the respondents uses resources only for fishing. Among Istrian fishermen there is no difference in the frequency of use of fishing resources for other activities with regard to membership in the fishing cooperative.

Table 20. Surveyed fishermen by activities in which they use fishing equipment

Area and membership in cooperative	Fishing only	Fishing and other related activities	Total
Istria, cooperative member	17	5	21
Istria, not in cooperative	8	3	11
Zadar, cooperative member	0	8	8
Zadar, not in cooperative	0	4	4
Total	25	20	44

Only one in 20 fishermen who use their fishing resources and other income-generating activities use the vessel for tourist and/or catering services, while all the others perform various other services such as passenger transport, towing, or other transport services. None of the respondents rent a boat or fishing equipment.

### 3.4 EMPLOYMENT AND SALARIES

At the level of the entire sample, the share of fishermen with employees with the employment contract is 67%. This way of employment arrangement actually means that the worker is full-time employed. One third of the respondents do not hire external labour and do not have workers on any contractual basis. However, these are mostly fishermen registered as crafts. Owners do not have to be employed, but usually pay health and pension contributions.

All surveyed fishermen from the area of Zadar have employees with an employment contract and do not use other ways of contracting work. In Istria, 55% of respondents have an employment contract. Looking at the membership in the fishing cooperative, the share of fishermen with employees on an



employment contract is significantly higher among the members of the cooperative (64%) than among those who are not (36%).

Among other ways of contracting work in Istria, fishermen use contracts for seasonal workers, which are regulated by special national regulations. The service contract or contract on particular work as another special type was recorded only once.

A total of 32 fishermen have full-time employees, and the total number of employed is 227, which gives a mean of 7 employees per fisherman. The median number of employees in fishermen who have full-time employees is 3.5. In the area of Zadar, the median is 9 among members of the cooperative, and 17.5 among those fishermen who are not members of the cooperative. In the latter group, the high median is also conditioned by one fisherman employing 60 workers, which is the highest among the respondents. In Istria, the median number of full-time employed is 2 for members of the cooperative and 1 for non-members.

The average number of seasonal workers during the year for fishermen who use seasonal workers (7 of them) is 2.9, and the median is 2. The number of seasonal workers per fishermen is from a minimum of 1 (Istria) to a maximum of 9 (Zadar).

Salaries in Croatia are calculated and paid monthly. According to the answers received from 29 respondents, the average monthly gross salary paid to employees is HRK 5,647 (about EUR 750), while the median is HRK 5,700 (about EUR 755). The median for Istria is HRK 5,000 for members of the cooperative, and HRK 3,800 for non-members. In the area of Zadar, the median gross monthly salary for cooperative members is HRK 6,000, and for non-members HRK 6,750. The higher level of salaries for permanently employed in the area of Zadar is apparent, where fishing companies are larger and at a higher level of commercialization.

The data on the average salary can be compared with the data on the average compensation of workers according to STECF, which we calculated as the quotient of workers' costs and the number of crew members less unpaid workers. This figure for 2018 was EUR 8,451 per year, which gives about EUR 705 per month. This is slightly less than the average salary stated by respondents (EUR 750), however the difference is very small. The EUROSTAT database provides data on the average compensation of employees of EUR 8,994 in fisheries for 2018, which gives us a monthly compensation of about EUR 750.

### 3.5 FISHING ACTIVITY

The surveyed fishermen from Istria spent a total of 4,838 days at sea, and fishermen from Zadar 1,815 days at sea. The total number of vessels of all respondents is 67, so that the number of days at sea per vessel is 99. The number of days at sea per vessel in the area of Zadar is higher than the average (107 days), and in the area of Istria it is lower (97 days). Respondents from the area of Zadar who are

members of the Cooperative have more days at sea per vessel than non-members, while the situation in the area of Istria is reversed.

According to the statistics of the Directorate of Fisheries, the number of days at sea per vessel in Croatia in 2018 was 32, in the RU Pula 62, and in the RU Zadar 24.

The arithmetic mean of the total catch quantity for all surveyed fishermen was 226.64 T and the median 7.3 T, which means that the distribution is very asymmetric, that is, positively skewed. The arithmetic mean of the quantity of catch for respondents from Istria is 13.6 T, and from the area of Zadar 812.5 T. The catch per vessel is 9 T in Istria, and 574 T for respondents from the Zadar area. At the same time, the members of the cooperative have a higher catch per vessel than non-members in Istria, and in the area of Zadar it is the other way around. In 2018, the Croatian fleet had a catch per vessel of 8.98 T, in the RU Pula it was 7.8 T, and in the Zadar unit 21.62.

According to estimated value of their catch, the surveyed fishermen generated an average of HRK 970,767 in revenue, while the median was HRK 233,400. The value of catches of surveyed fishermen from the area of Zadar is on average HRK 2,775,833, and from the area of Pula HRK 223,843. The value of catches per vessel among surveyed fishermen (HRK 594,051) is significantly higher than the same value at the level of the national fleet (HRK 58,375), as well as than the value at the level of their regions.

### 3.6 TRENDS IN BASIC BUSINESS INDICATORS

For most of the observed six indicators, respondents are of the opinion that the trend of their values is stable. Only the trends of activity and catch stand out, that is, days at sea and total catches, which the respondents consider to have a declining trend. A stable trend in the number of vessels is expected due to the limitation of the size of the fleet. However, worrying is the high percentage of fishermen according to whom the trend in the number of days at sea and total catch is declining (44% and 40% of respondents, respectively). With these indicators, we also record the highest division of respondents, because those who believe that the trend is stable also have a high percentage.

**Table 21. Trends in the main indicators of fishing activity**

Variable	General trend			Subtotal	Missing	Total
	(frequency, percent)					
	Stable	Upsizing	Downsizing			
Number of vessels	80	11.1	8.9	-	-	100
Days at sea	42.2	8.9	44.4	95.6	4.4	100
Total catch	35.6	20	40	95.6	4.4	100
Total fishing revenue	44.4	17.8	31.1	93.3	6.7	100
Full time employees	51.1	2.2	17.8	71.1	28.9	100
Average monthly gross salary	48.9	13.3	2.2	64.4	35.6	100

The share of fishermen who think that the trends are declining is higher in the area of Zadar for all indicators except for the total income from fishing and the average monthly gross salary.

Fishermen's comments regarding the basic indicators of fishing activity can be summarized as follows:

- income and catches grew among Istrian fishermen who increased the number of days at sea,
- according to one respondent from the Zadar area, the average price of fish is rising slightly so that income remains at approximately the same level,
- according to the respondent from Istria, the prices of small fish are falling.

When asked if 2019 was an ordinary year for fishing, the answers of fishermen are quite evenly divided into affirmative and negative. Of the 44 who answered this question, 23 believe that 2019 was ordinary. Those fishermen who stated that the year was not ordinary for the most part hold that it was worse than previous years. We notice differences with regard to the area, because a larger percentage of fishermen from the area of Zadar believe that the year was ordinary, and those from the area of Istria are more of the opinion that it was not typical.

The fishermen explained their opinions with the reasons given in Table 22.

**Table 22. Reasons why fishermen think that 2019 was worse than others**

Reason	Frequency	Valid Percent
Reduced catch, bad weather	7	31.8
Reduced catch, the cooperative reduced by-out	1	4.5
Some species are less abundant (e.g. Sole fish, squids)	2	9.1
Greater number of dolphins	1	4.5
Vessel under repair	3	13.6
Other	8	36.4

### 3.7. FISH CATCH DATA IN 2019

Data on the catch by species were given by fishermen in T or as a percentage of total catches. If the catch for each species was given as a percentage, then the catch in T was calculated on the basis of the total quantity of catches referred to in question 9.3. A total of 23 species of fish and other marine organisms and a category of other or mixed catch were recorded. In surveys from the area of Istria, 20 out of a possible 24 categories appear, and from the area of Zadar only 6 categories. The number of species per fisherman is from 1 to 7, and the arithmetic mean of the number of species per fisherman is 3.6. With the same range of species per fisherman in Istria, the arithmetic mean is 3.72. In the area of Zadar, the number of species per fisherman is 2-4, with an arithmetic mean of 3.25.

Most of the surveyed fishermen in Istria (14 out of 33) catch Sole fish. What follows are Musky octopus, Red mullet, Cuttlefish and other species (mixed catch) caught by 13 fishermen and Gilthead sea bream (11 fishermen). In the area of Zadar, the largest number of fishermen catch European pilchard and European anchovy.

The highest amount of catch of all fishermen are for the species of European pilchard (6,359 T) and European anchovy (1,961 T) (Table 23). With quantities above 100 T there are also Tuna (477 T), Atlantic chub mackerel (325 T) and Horse mackerel (165 T).

In the total catch of all surveyed fishermen, the first 10 of 24 species have a share of 99.44%. Only two species, European pilchard and European anchovy, make up 87.6% of the total catch, which is largely due to a group of respondents from the Zadar area.

In Istria, the European pilchard ranks first in terms of the amount of catch, and Sole fish and Red mullet are still quite common. However, unlike Zadar, here a significant part of the catch falls on other marine organisms than fish, especially Musky octopus, and shellfish and squids. The percentage of the first three categories (European pilchard, Musky octopus and mixed catch) in the total catch is 75.76%.

In the structure of catches of surveyed fishermen from the Zadar area, along with European pilchard and European anchovy, Tuna, Atlantic chub mackerel and Horse mackerel are also caught. The first three species (European pilchard, European anchovy and Tuna) account for 94.41% of the total catch of this segment of the sample.

The most specialized are fishermen who catch European pilchard (13 of them) and Warty venus (4), because these species make up over 50% in total catch of those fishermen on average (73% and 66% respectively). In Istria County, the specialization is the largest in fishing European pilchard (1 fisherman, 100% of the catch) and Warty venus (4 fishermen, 66%). In the area of Zadar, all fishermen catch European pilchard, and it is the only species with the mean share in total catch higher than 50% (it is 73%).

**Table 23. An overview of information on catch for surveyed fisherman**

Species	T o t a l				I s t r i a				Z a d a r			
	N	Me an	Total catch	% in total catc h	N	Me an	Total catch	% in tot al cat ch	N	Me an	Total catch	% in total catc h
European pilchard, T	13	489.12	6358.50	66.96	1	252.00	252.00	56.53	12	508.88	6106.50	67.48
European anchovy, T	12	163.38	1960.50	20.65				.00	12	163.38	1960.50	21.66
Tuna, T	1	477.00	477.00	5.02				.00	1	477.00	477.00	5.27
Atlantic chub mackerel, T	7	46.43	325.00	3.42				.00	7	46.43	325.00	3.59
Horse mackerel, T	6	27.50	165.00	1.74				.00	6	27.50	165.00	1.82
Other (mixed catch), T	14	4.09	57.20	.60	13	3.17	41.20	9.24	1	16.00	16.00	.18
Musky octopus, T	13	3.42	44.48	.47	13	3.42	44.48	9.98				.00
Sole fish, T	14	1.68	23.58	.25	14	1.68	23.58	5.29				.00
Red mullet, T	13	1.72	22.30	.23	13	1.72	22.30	5.00				.00
Warty venus, T	4	2.36	9.46	.10	4	2.36	9.46	2.12				.00
Cuttlefish, T	13	.72	9.30	.10	13	.72	9.30	2.09				.00
Gilthead sea bream, T	11	.80	8.82	.09	11	.80	8.82	1.98				.00
Squid, T	9	.88	7.90	.08	9	.88	7.90	1.77				.00
European hake, T	6	1.10	6.61	.07	6	1.10	6.61	1.48				.00
Shark, T	2	2.40	4.80	.05	2	2.40	4.80	1.08				.00

Ark clams, T	3	1.55	4.64	.05	3	1.55	4.64	1.04			.00
Grey mullet, T	4	1.14	4.56	.05	4	1.14	4.56	1.02			.00
Mediterranean scallop, T	5	.41	2.05	.02	5	.41	2.05	.46			.00
European hake, T	2	.86	1.71	.02	2	.86	1.71	.38			.00
Octopus, T	3	.48	1.44	.02	3	.48	1.44	.32			.00
Oysters, T	2	.18	.35	.00	2	.18	.35	.08			.00
Smooth clam, T	2	.14	.27	.00	2	.14	.27	.06			.00
European lobster, T	2	.09	.17	.00	2	.09	.17	.04			.00
Goldlin, T	1	.10	.10	.00	1	.10	.10	.02			.00

The types of fishing techniques and gear used are determined by the type of catch. An overview of the types of gear used and the share of catches made by each tool among fishermen who use them (%), confirm the large differences between fishermen surveyed in the area of Zadar and in the area of Istria. First ranked tool by the number of fishermen who use it is the set gillnet (17), and it is used only in Istria (Table 24). The second ranked tool is purse seine (13) which is used almost exclusively in the area of Zadar.

**Table 24. Number of fishermen and average share in total catch by type of fishing gear**

Type of fishing gear	Total		Istria		Zadar	
	N	Mean, % of total catch	N	Mean, % of total catch	N	Mean, % of total catch
Set gillnet	17	72.9	17	72.9		
Purse seine for European pilchard	13	97.6	1	100.0	12	97.3
Bottom otter trawl	11	75.9	11	75.9		
Dredge	4	41.3	4	41.3		
Fishing gaff	4	51.3	4	51.3		
Hooks and lines	3	6.7	3	6.7		
OTH	3	100.0	3	100.0		

Pelagic trawl	2	100.0	2	100.0		
Pots and traps	2	10.0	2	10.0		
Trammel net	2	55.0	2	55.0		
Seine	1	31.8			1	31.8
Shellfish fishing tools	1	5.0	1	5.0		
Scuba gear	1	100.0	1	100.0		

Purse seine and seine are the only tools mentioned by fishermen in the Zadar area. Used tools are much more diverse in Istria where, in addition to a set gillnet, bottom otter trawl, dredge and fishing gaff are also used to a greater extent. Most tools are characterized by a fairly high specialization because the percentages in the total catch per tool are generally higher than 50%. This is especially true for OTH and pelagic trawl (on average 100% of the total catch), purse seine (97.6%), bottom otter trawl (75.9%) and set gillnet (72.9%).

### 3.8. ECONOMIC INDICATORS FOR SURVEYED FISHERMEN

All calculations and analyses in this chapter were carried out with total amounts and global ratios, i.e. the business ratios were calculated based on the sum of the values of the included variables for each group and subgroup. In this way, the values of revenues and expenditures were obtained, from which the business indicators were calculated for the following subgroups of fishermen:

1. all fishermen from the area of Istria.
2. fishermen from the area of Istria who are members of the cooperative.
3. fishermen from the area of Istria who are not members of the cooperative.
4. all fishermen from the area of Zadar.
5. fishermen from the area of Zadar who are members of the Omega 3 cooperative.
6. fishermen from the area of Zadar who are members of the Omega 3 cooperative.

The data for the calculation of business performance indicators and the assessment of the economic situation were collected for 32 fishermen using a total of 37 vessels. 20 of them are from the Istrian area and 12 from the Zadar area, and they have a total of 126 employees and only one of them has an unpaid crew member. The results of the calculations are presented in Table 25.

The results indicate large differences in income, as fishermen from the area of Zadar have ten times higher income than fishermen from the area of Istria. However, fishermen from Istria have a higher share of income from activities other than fishing.



In terms of fishing costs (excluding depreciation), labor costs (37%) and fuel and energy costs (34%) have the largest shares. Looking at the studied areas, we can see that the share of labour costs is significantly higher in the area of Zadar than in the area of Istria, because fishermen in Zadar employ more people. The third most important cost item by share in total costs for Istrian fishermen is other variable costs, while for Zadar fishermen it is repair and maintenance costs.

The highest gross profit margin by subgroups is achieved by fishermen from the Zadar area who are members of the fishermen's cooperative (31.1%), followed by fishermen from the Zadar area who are not members of the cooperative (27.7%). Fishermen who are not members of the cooperative from the area of Istria have a negative gross margin, but these are only three included in the analysis, so the information must be interpreted taking this into account.

The group with the lowest (negative) gross profit margin also has the lowest net profit, i.e. the difference between total revenue and total costs. Profit margin as a relative performance indicator was calculated as the ratio of net profit to total revenue. Note that the calculation used is methodologically not the same as the net profit margin calculation in the STECF reports and cannot be directly compared to it. At the level of the whole group, the calculated net profit margin is 21%, and in terms of areas, the net profit margin in the Zadar area is only half a percentage point higher than in Istria. The lowest net profit margin has the subgroup of fishermen who are not members of the cooperative from Istria (-1.9%), and the highest group of fishermen from the area of Zadar who are members of the cooperative Omega 3 (22.9%).

If we express the business results per vessel for a given group and subgroup, it becomes clear that the revenues from the sale of landings of fishermen from the area of Zadar are several times higher than those from the area of Istria. The same applies to other indicators, because fishermen from the Zadar area have larger and better equipped vessels. Therefore, the fishermen from Zadar have higher values in all cost items as well as in performance indicators: gross value added, gross profit and net profit per vessel.

Table 25. Glavni ekonomski pokazatelji za anketirane ribare po područjima anketiranja / Main economic indicators of the interviewed fishermen by studied areas

Pokazatelj <sup>+</sup>	Item <sup>+</sup>	Istria – all	Istria, coop.	Istria, not coop.	Zadar - all	Zadar, coop.	Zadar, not coop.	A L L
Broj plovila	Number of vessels	20	17	3	17	9	8	37
Broj ribara	Number of fishermen	20	17	3	12	8	4	32
Broj zaposlenih	Number of employees	21	18	3	105	63	42	126
Broj neplaćenih radnika	Non-paid workers	1	1	0	0	0	0	1
<b>PRIHODI</b>	<b>REVENUES</b>							
Prihod od iskrcaja	Revenues from landing	3,392,556	3,324,127	68,429	33,247,241	18,593,301	14,653,939	36,639,797
Ostali prihodi	Other revenues	878,260	863,150	15,110	64,663	0	64,663	942,923
<b>NAKNADE RADNICIMA</b>	<b>COMPENSATION TO STAFF</b>							
Plaće i nadnice posade	Wages and salaries	673,377	641,657	31,721	9,307,604	4,974,779	4,332,825	9,980,981
Vrijednost neplaćenog rada	Non-paid labour value	32,066	35,648	0	0	0	0	79,214
<b>TROŠKOVI</b>	<b>COSTS</b>							
Troškovi goriva i energije	Energy costs	1,451,584	1,421,695	29,889	7,622,015	4,764,899	2,857,116	9,073,599
Troškovi popravaka i održavanja	Costs of repairs and maintenance	215,246	203,246	12,000	3,451,748	2,122,507	1,329,241	3,666,994
Ostali varijabilni troškovi	Other variable costs	638,885	633,538	5,348	1,501,236	562,904	938,332	2,140,122
Fiksni troškovi	Non-variable costs	269,674	263,474	6,200	1,570,264	388,419	1,181,845	1,839,938

Amortizacija	Depreciation	<b>73,388</b>	73,388	0	<b>2,543,852</b>	1,527,273	1,016,579	<b>2,617,241</b>
<b>POKAZATELJI</b>	<b>INDICATORS</b>							
Bruto dodana vrijednost	Gross value added	<b>1,695,427</b>	1,665,324	30,103	<b>19,166,642</b>	10,754,573	8,412,068	<b>20,862,068</b>
Bruto profit	Gross profit	<b>989,984</b>	988,020	-1,618	<b>9,859,038</b>	5,779,794	4,079,243	<b>10,801,873</b>
<i>Bruto profitna marža</i>	<i>Gross profit margin</i>	<b>23.2%</b>	23.6%	-1.9%	<b>29.6%</b>	31.1%	27.7%	<b>28.7%</b>
Neto profit	Net profit	<b>916,596</b>	914,632	-1,618	<b>7,315,185</b>	4,252,521	3,062,664	<b>8,184,632</b>
<i>Neto profitna marža</i>	<i>Net profit margin</i>	<b>21.5%</b>	21.8%	-1.9%	<b>22.0%</b>	22.9%	20.8%	<b>21.8%</b>

+ Vrijednosti predstavljaju zbrojeve vrijednosti po pojedinoj skupini i iskazane su u HRK / Values are calculated as a sum of values for each group, in HRK.

### 3.9. SALES CHANNELS

The largest number of surveyed fishermen sell fish to fishing cooperatives (33) and they are mostly members of cooperatives, except in 3 cases. The proportions of fishermen selling to cooperatives are similar in Istria and the Zadar area (73% and 75% respectively). After the cooperatives, fishermen usually sell to HORECA but only in Istria, where there are 7 of them who do it. They are followed in six cases by wholesalers for foreign markets, domestic fish processors and fish markets. Three fishermen in Istria have direct sales to consumers, and three fishermen from the Zadar area sell to tuna farmers. Two fishermen listed wholesalers in the national market as buyers.

The number of customers by species varies, with the number of customers per fisherman in direct sales standing out. With the exception of this channel, the number of customers per fisherman ranges from 1 to 15. Most buyers per fisherman are from the HORECA category (average 5.6), while the number of buyers in all other categories is on average less than 2. For Zadar fishermen, the mean number of buyers is 2 or more than two for the categories of wholesalers on the domestic market and wholesalers on the foreign market.

**Table 26. Number of customers by type, survey area and membership in the fishing cooperative**

Indicator	Wholesalers in the national market	Wholesalers in foreign markets	Domestic fish processors	HORECA	Fish market and shops	Cooperative	Direct sale to consumer	Tuna farms
<b>Total</b>								
Mean	1.5	1.7	1.3	5.6	1.3	1.0	183.7	1.3
Median	1.5	1.0	1.0	3.0	1.0	1.0	50.0	1.0
N	2	6	6	7	6	33	3	3
Minimum	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Maximum	2.0	4.0	3.0	15.0	2.0	1.0	500.0	2.0
<b>Istra, coop. Member</b>								
Mean				6.3	2.0	1.0	1.0	
Median				4.5	2.0	1.0	1.0	
N				4	1	22	1	
Minimum				1.0	2.0	1.0	1.0	
Maximum				15.0	2.0	1.0	1.0	
<b>Istra, not in coop.</b>								
Mean		1.3		4.7	1.2	1.0	275.0	
Median		1.0		3.0	1.0	1.0	275.0	
N		3		3	5	2	2	
Minimum		1.0		1.0	1.0	1.0	50.0	
Maximum		2.0		10.0	2.0	1.0	500.0	

**Table 25. Number of customers by type, survey area and membership in the fishing cooperative, continued**

Indicator	Wholesalers in the national market	Wholesalers in foreign markets	Domestic fish processors	HORECA	Fish markets and shops	Cooperative	Direct sale to consumer	Tuna farms
<b>Zadar, coop. Member</b>								
Mean	1.0	1.0	1.0			1.0		
Median	1.0	1.0	1.0			1.0		
N	1	1	2			8		
Minimum	1.0	1.0	1.0			1.0		
Maximum	1.0	1.0	1.0			1.0		
<b>Zadar, not in coop.</b>								
Mean	2.0	2.5	1.5			1.0		1.3
Median	2.0	2.5	1.0			1.0		1.0
N	1	2	4			1		3
Minimum	2.0	1.0	1.0			1.0		1.0
Maximum	2.0	4.0	3.0			1.0		2.0

Despite the fact that the maximum number of customers per surveyed fisherman is higher in Istria, the average number of customers per fisherman in Istria is 2.27, and for Zadar 2.5. This is a consequence of a large percentage of fishermen in Istria who sell to only one buyer, and in most cases it is a fishing cooperative (19 out of 25).

As can be seen from Table 27, fishing cooperatives have the largest mean proportion in the total sales from fishermen: 88.79%. The proportions of more than 50% also have the categories of wholesalers in foreign markets and fish markets and shops. The lowest proportions apply to the categories of tuna farms and fish processors, which means that fishermen who sell to these buyers, also sell to others to a greater extent.

**Table 27. Buyers by average share in fishermen sales and number of fishermen they sell to, basic statistics**

Buyer category	Istria				Zadar				Total	
	In coop.		Not in coop.		In coop.		Not in coop.		Mean, % in sales	N
	Mean, % in sales	N	Mean, % in sales	N	Mean, % in sales	N	Mean, % in sales	N		
Wholesalers in the national market					5.00	1	80.00	1	42.50	2
Wholesalers in foreign markets			100.00	3	5.00	1	33.20	2	61.90	6
Domestic fish processors					7.50	2	29.20	4	21.97	6
HORECA	33.75	4	37.33	3					35.29	7
Fish markets and shops	15.00	1	66.00	5					57.50	6
Cooperative	92.91	22	60.00	2	84.50	8	90.00	1	88.79	33
Direct sale to consumer	5.00	1	70.00	2					48.33	3
Tuna farms							15.60	3	15.60	3

These are the trends observed and stated by individual fishermen regarding different categories of customers:

1. Wholesalers in the national market:
  - an increase in the quantity of European pilchard is noticed.
2. Wholesalers in foreign markets:
  - buy out takes place throughout the year
  - fish that has undergone the primary processing process in the cooperative is sold
  - the amount of anchovy does not change.
3. Domestic fish processors:
  - fish is purchased for canning
  - one of the processors is owned by a wholesale company.
4. HORECA:
  - they mostly buy high quality demersal fish, squid, octopus and lobsters
  - larger fish are demanded
  - higher price can be achieved
  - restaurant sales are seasonal, and are highest in the spring, before the season
  - for sale to restaurants you need to get an agreement with the owner
  - restaurants prefers high quality demersal fish caught with fishing gaff .
5. Fish markets and shops:
  - most is sold in July and August
  - sales include demersal fish, squid, octopus, fish broth

- the season catch determines the offer.
- 6. Cooperative:
  - prices are lower in 2020 due to COVID-19 pandemic
  - the advantage is the permanence of redemption
  - sale to cooperatives usually means sale for export, either fresh (Istria) or processed fish (Zadar)
  - the largest export market is Italy.
- 7. Direct sale to consumer:
  - customers are price sensitive.

In order to obtain information on the importance of certain factors of purchase for customers from the point of view of fishermen, respondents rated the importance of seven factors for certain categories of customers, as follows:

1. Price
2. Freshness
3. Fishing technique
4. Known provenance
5. Assortment width
6. Quality and reliability of delivery
7. Quality certificate

The importance was rated on a scale from 1 to 3, with 1 meaning that the factor is not important, 2 that it is neither important nor unimportant, and 3 that the factor is very important. An overview of the obtained grades can be found in Table 28.

**Table 28. Statistics of the importance of purchasing factors for different buyers by region**

Regional unit	Istria				Zadar region				Total			
	Mean	N	Min	Max	Mean	N	Min	Max	Mean	N	Min	Max
<b>Price</b>	<b>2.5</b>				<b>3.0</b>				<b>2.7</b>			
wholesalers	3.0	5	3	3	2.8	6	2	3	2.9	11	2	3
processors					3.0	5	3	3	3.0	5	3	3
HORECA	2.3	4	2	3					2.3	4	2	3
fish shops	2.8	8	2	3	3.0	1	3	3	2.8	9	2	3
cooperative	2.4	24	1	3	3.0	9	3	3	2.6	33	1	3
<b>Freshness</b>	<b>3.0</b>				<b>2.7</b>				<b>2.9</b>			
wholesalers	3.0	5	3	3	3.0	6	3	3	3.0	11	3	3
processors					2.6	5	2	3	2.6	5	2	3
HORECA	3.0	4	3	3					3.0	4	3	3

fish shops	3.0	8	3	3	3.0	1	3	3	3.0	9	3	3
cooperative	3.0	24	3	3	2.4	9	1	3	2.8	33	1	3
<b>Fishing technique</b>	<b>1.5</b>				<b>1.8</b>				<b>1.6</b>			
wholesalers	1.4	5	1	3	2.0	6	1	3	1.7	11	1	3
processors					1.4	5	1	3	1.4	5	1	3
HORECA	1.3	4	1	2					1.3	4	1	2
fish shops	1.5	8	1	3	3.0	1	3	3	1.7	9	1	3
cooperative	1.5	24	1	3	1.8	9	1	3	1.6	33	1	3
<b>Known provenance</b>	<b>2.6</b>				<b>1.9</b>				<b>2.4</b>			
wholesalers	2.2	5	1	3	2.0	6	1	3	2.1	11	1	3
processors					1.6	5	1	2	1.6	5	1	2
HORECA	2.5	4	1	3					2.5	4	1	3
fish shops	2.6	9	1	3	3.0	1	3	3	2.6	10	1	3
cooperative	2.8	22	1	3	1.8	9	1	3	2.5	31	1	3
<b>Assortment width</b>	<b>2.1</b>				<b>1.6</b>				<b>2.0</b>			
wholesalers	1.6	5	1	2	1.7	6	1	3	1.6	11	1	3
processors					1.0	5	1	1	1.0	5	1	1
HORECA	2.0	4	1	3					2.0	4	1	3
fish shops	2.1	10	1	3	3.0	1	3	3	2.2	11	1	3
cooperative	2.3	22	1	3	1.7	9	1	3	2.1	31	1	3

**Table 28. Statistics of the importance of purchasing factors for different buyers by region, continued**

Regional unit	Istria				Zadar region				Total			
	Mean	N	Min	Max	Mean	N	Min	Max	Mean	N	Min	Max
<b>Reliability of delivery</b>	<b>2.8</b>				<b>2.7</b>				<b>2.8</b>			
wholesalers	2.6	5	2	3	3.0	6	3	3	2.8	11	2	3
processors					3.0	5	3	3	3.0	5	3	3
HORECA	2.8	4	2	3					2.8	4	2	3
fish shops	2.9	8	2	3	3.0	2	3	3	2.9	10	2	3
cooperative	2.9	23	1	3	2.3	8	1	3	2.7	31	1	3
<b>Quality certificate</b>	<b>2.1</b>				<b>2.0</b>				<b>2.1</b>			
wholesalers	1.0	4	1	1	2.5	6	1	3	1.9	10	1	3
processors					1.4	5	1	3	1.4	5	1	3
HORECA	2.0	4	1	3					2.0	4	1	3
fish shops	2.1	8	1	3	1.0	1	1	1	2.0	9	1	3
cooperative	2.4	22	1	3	2.1	9	1	3	2.3	31	1	3



The greatest importance expressed through the arithmetic mean is freshness (2.9) followed by quality and reliability of delivery (2.8) and price (2.7). According to fishermen from Istria, the first two factors in terms of importance are freshness (3.0) and quality of delivery (2.8), and the third known provenance (2.6) is for the freshness factor. Zadar fishermen gave the highest average importance for customers to the price (3.0), followed by freshness and quality of delivery (both 2.7).

As seen by customer category, according to the answers of the fishermen, the greatest mean importance for wholesalers have freshness (3.0) and price (2.9) The most important buying criteria for food processors is the price and the constancy and timeliness of delivery (both 3.0). In the HORECA sector, the factors of freshness (3.0) and reliability of delivery (2.8) are of the greatest importance. Fish shops and markets attach the greatest importance among the seven factors to freshness (3.0), reliability of delivery (2.9) and price (2.8). Finally, fishermen believe that the most important thing for cooperatives when buying is freshness (2.8) followed by reliability of delivery (2.7).

The highest mean importance for all factors of purchase have fish markets and cooperatives (2.4), followed by HORECA and wholesalers (2.3), and the lowest mean have processors.

Seven fishermen commented on the importance of individual buying factors for different categories of buyers. These are individual comments related to the research topic:

1. The fisherman cannot influence the price because the buyers and the market determine the price.
2. Fishing technique is not important, it is chosen according to the species caught.
3. The cooperatives refuse to take worse fish and lowers the price of lower quality fish too much.
4. Restaurants have sufficient supply of fish, so price and reliability are not important to them.
5. There is unfair competition that makes it difficult for small fishermen to sell, they sell fish hard.
6. All factors are equally important.

When asked whether they noticed an increased interest of buyers for some of the factors of purchase, 17 answers were collected: 15 in Istria and 2 in Zadar. Fishermen's responses are shown in Table 29 by categories based on original responses.

**Table 29. Commentaries on changes in the interest on purchasing criteria**

Group of commentaries	Number of answers		
	Istria	Zadar	All
Buyers pay more attention to quality: the fish must be fresh, whole and clean	5	0	5
More attention is given to the price of fish	4	0	4
Price and freshness gets more attention	3	0	3
Other	3	2	5

Based on the answers received, we can say that some fishermen notice an increase in customer interest in the quality of fish, as well as the price.

### 3.10. PROMOTION AND WAYS OF IMPROVEMENT OF FISH SALES AND FISHERY PRACTICE

A total of 40 answers to the question of which species of fish and on which market it should be promoted were collected, 28 in Istria and 12 in the area of Zadar (Table 30).

The following two suggestions were made by 10 respondents each:

- Sole fish, red mullet, grey mullet.
- Fresh European pilchard for the domestic market, frozen and canned for foreign markets.

**Table 30. Frequencies of interviewees' suggestions on what types of fish and for which market should be promoted (by regions and membership in cooperative)**

Answer category	Survey region		Membership in cooperative		All respondents
	Istria	Zadar	Members	Non-members	
Fresh Sardine for the domestic market, frozen and canned for foreign markets	1	9	8	2	10
Oysters	2	0	0	2	2
Sole fish, Red mullet, Grey mullet	10	0	8	2	10
All fish	8	1	9	0	9
Other	7	2	3	6	9
Total	28	12	28	12	40

A frequent answer is that all types of fish from the Adriatic should be promoted, while two fishermen who are not members of the fishing cooperative stated that oysters should be promoted as well. In the answer category Other are following individual suggestions:

- Promote the species of bluefish, leerfish, seabream, saddled seabream, horse mackerel, grey mullet and small pelagic, lower price fish that are available throughout the year, in all markets.
- Promote high quality demersal fish (common name for this category in Croatia is "white fish").
- Promote octopus on the Istrian market.
- Tourists should be encouraged to consume local products, fish and shellfish in order to increase the demand and prices.
- Promote salted European pilchard and marinated European anchovy in the Republic of Croatia and the EU.

When asked which aspects of the existing way of fishing should be promoted, the fishermen mostly answered that it is the preservation of fish stock (19 out of 44 answers). In addition, 12 fishermen from Istria state that traditional ways of fishing needed to be preserved and maintained. The importance of fishing for food safety and quality and the nutritional value of pelagic fish and other low-priced fish are also mentioned.

**Table 31. Frequencies of interviewees' suggestions on what aspects of fishery practice should be promoted by regions and membership in cooperative**

Group of answers	Survey region		Membership in cooperative		All respondents
	Istria	Zadar	Members	Non-members	
Traditional fishing practices	12	0	9	3	12
Conservation of the fish stock	11	8	11	8	19
Safety and quality of nutrition of the local population	3	0	3	0	3
Quality and nutritional value of pelagic fish and other lower priced fish	1	1	0	2	2
Other	6	2	7	1	8
Total	33	11	30	14	44

Among the answers under the category Other are ecological aspects of fishing, education of local population about the importance of fish consumption for health, and the need to promote all important aspects (ecology, tradition, food safety, food quality...).

As for ways in which fishing could be improved, the most responses (8) say that it is investments: the acquisition of new vessels, tools, equipment and technology. This is especially true for fishermen from the Zadar area. According to their size of business, fishermen in Istria emphasize the need subsidy for fishing and purchase of small vessels.

**Table 32. Frequencies of interviewees' suggestions on fishery performance improvement by regions and membership in cooperative**

Group of answers	Survey region		Membership in cooperative		All respondents
	Istria	Zadar	Members	Non-members	

Financial support for fishing and the purchase of small vessels	5	0	2	3	5
Stricter measures to preserve fish and shellfish stocks (additional quotas, fleet reduction, abolition of aggressive tools)	3	2	0	5	5
Administrative and financial relief of fishermen	1	1	1	1	2
To strengthen fishing controls	1	0	0	1	1
To increase fish prices	1	0	1	0	1
Acquisition of new ships, introduction of new tools, equipment and technology	1	7	5	3	8
Other	2	0	0	2	2
Total	14	10	9	15	24

In five occasions it is stated that stricter measures to preserve the fish stock and other marine organisms would help improve fishing in the Adriatic. Two replies suggest a reduction in the administrative burden on fishermen, and one suggests stronger fishing control and price increases as ways to improve.

### 3.11. THE IMPACT OF SUSTAINABLE FISHING CERTIFICATES ON FISHERMEN'S BUSINESS

One of the key issues in this socio-economic research related to the objectives of the PRIZEFISH Project is the question of assessing what impact the implementation of sustainable or ecological fishing labels could have on fishermen's business. The question was posed in such a way that respondents could choose the direction and strength of the impact on a scale of -3 to +3, where -3 means a very negative effect and +3 a very positive effect. Respondents estimated the expected impact on 11 different segments of their business as listed in Table 33.

**Table 33. Estimation of the expected effect of the introduction of the label of sustainable or ecological fishing, basic statistics**

Aspects of business	Survey region				Membership in cooperative				All respondents	
	Istria		Zadar		Yes		No			
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Total sales	1.30	33	1.58	12	1.40	30	1.33	15	1.38	45
Fish price	1.67	33	2.00	12	1.80	30	1.67	15	1.76	45
Competitiveness (with respect to other fishermen)	1.36	33	1.58	12	1.27	30	1.73	15	1.42	45
Image or reputation	1.76	33	2.67	12	1.90	30	2.20	15	2.00	45
Links with the distribution chain	1.33	33	1.67	12	1.50	30	1.27	15	1.42	45
Costs	-.30	33	-1.00	12	-.33	30	-.80	15	-.49	45
Administration	-.67	33	-1.33	12	-.73	30	-1.07	15	-.84	45
External monitoring and certification)	.27	33	-1.58	12	.03	30	-.73	15	-.22	45
Connection with research institutions	.91	33	.75	12	.77	30	1.07	15	.87	45
Management and rights system in fisheries (quotas, limits...)	-.06	33	-.25	12	-.37	30	.40	15	-.11	45
Fishing gear and technology	-.12	33	1.58	12	.17	30	.67	15	.33	45

Respondents from Istria estimate that, on average, the introduction of certificates and labels for sustainable or ecological fishing would have the most positive impact on the image of fishermen, and a negative effect on the relationship and cooperation with the research institutions. However, all negative mean values are close to the neutral effect (0). They also expect a positive effect on the selling price of fish, competitiveness, links within the supply chain and overall sales.

For Zadar fishermen, ranks according to the mean effect for different business segments are almost the same like in Istria. However, it is noticeable that their estimates are closer to the highest values in both positive and negative directions. Mean ratings of negative sign for Istrian fishermen are of low intensity (up to -1), while for Zadar fishermen mean ratings of negative impact are higher than one for categories costs, administration and external supervision with certification.

In terms of membership in a fishing cooperative, fishermen generally agree about impact pathways of implementing sustainable or ecological fishing labels. The only aspects of the business in which the signs differ are the external control for certification and the fisheries management system. However, in these two categories the average values are close to neutral (0). Fishermen in cooperatives on average expect

the highest positive effect on the image and reputation, and price. Fishermen outside the cooperatives also believe that the positive effect will be greatest on the image, and in second place by average rating is competitiveness. There is no markedly negative value among the mean rating and the lowest is -1.07 in business administration.

There were 11 comments from respondents regarding the answers on the possible impact of the sustainability label or eco-label on business. The comments can be summarized in the following:

- A certificate of sustainable or eco fishing should lead to a price increase, but this does not have to be realized.
- Labels would mean more if the customers are restaurants, that is, HORECA.
- Competitiveness will only increase if stricter controls on illegal catches are introduced and if the market and labelling are regulated.
- The introduction of such label is likely to have a positive impact on all aspects of the business.
- For fishermen in Istria, the buyer of fish through the cooperative is Italy, and there is actually 1 buyer (several companies of the same group): it can dictate the conditions.
- A prerequisite for a positive effect is the solution of the problem of big industry and sewage: we have to keep the sea clean.
- Increased restrictions associated with certification in order to reduce the number of fishing days will have a negative effect on small-scale fishermen.

### 3.12. EXPECTED IMPACT OF THE PRIZEFISH PROJECT ON THE FISHERMEN'S BUSINESS

Questions about the benefits of the PRIZEFISH Project are separated according to whether the respondent is associated to the project (members of cooperative) or not associated to the project (non-members of cooperative).

A total of 28 responses were collected from the fishermen associated with the project. Most of them said that they expect benefits through the possibility of equipping the vessel with a pump by the project. One part of the fishermen to this answer added that this should enable a higher quality of catch and a safe job.

**Table 34. Expected impacts of the PRIZEFISH Project on business to fishermen associated with the project, frequencies**

Categories of responses	Response frequency
Possibility of equipping (pump)	5
Promotion of fishery	4
Increasing product quality	3
Does not expect benefits	3
Does not know	3
Informing and education	2
Financial support	2
Easier placement of fish	2
More complications and more work for fishermen	2
Introduction of new products with added value	2
Benefits for cooperatives	1
Better safety for the crew	1
Increase of fish price	1
Connecting fishermen	1
Only big enterprises will have benefits	1
Total	28

The benefits through the promotion of fishing, fishermen and fishery products are listed in four responses. Three times the answer was that the project should contribute to increasing product quality. Three respondents each answered that they did not expect a benefit or did not know what the benefits might be. Three responses call into question the positive impact of the project. In two responses, fears are expressed that the project will lead to more complications, additional work load and loss of time for fishermen, and in one, that only large fishermen can expect benefits.

Fishermen from Istria are less enthusiastic, so that relatively few of them answered to this question, and there were answers such as "I do not expect benefits" or "There will be no benefits but problems". Fishermen not associated with the project provided 15 answers to the question of what they expected the project would bring to the project participants. These responses were grouped into 7 categories



(Table 35). Most responses from the fishermen in this group is in the category of procurement of new equipment that will increase the quality of catches, improve working conditions, and enable the preservation of fish stocks (4). All these answers are from the region of Zadar.

**Table 35. Expected impacts of the PRIZEFISH Project on business to fishermen that not associated with the project, frequencies**

Response categories	Frequencies		
	Regional unit		Total
	Istria	Zadar region	
Better sales due to the introduction of certification	3	0	3
Higher prices due to the introduction of certification	1	0	1
Promotion of fishery	1	0	1
Informing and educating fishermen	1	0	1
New equipment that will increase the quality of catches, safety on board and contribute to the preservation of fish stocks	0	4	4
Innovations in technology and products	1	0	1
Other	4	0	4
Total	11	4	15

Second in terms of number of citations is the expectation of increased sales due to certification (3). All other expected benefits, from promotion through increase in sales price to implementation of innovations, were mentioned once. Among the responses from fishermen not associated with the project, only one response expressed concern about the benefits of the project: "It sounds nice, but the reality is different."

## 4. LITERATURE AND DATA SOURCES

1. BISNODE (n.d.) Boniteti.hr. Available at: <https://www.bisnode.hr/proizvodi/bisnode-boniteti-hrvatska/>
2. Croatian Bureau of Statistics (CBS) (2018) Employment and Wages, 2017. Statistical report 1625. Available at: [https://www.dzs.hr/Hrv\\_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx](https://www.dzs.hr/Hrv_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx)
3. Croatian Bureau of Statistics (CBS) (2017) Employment and Wages, 2016. Statistical report 1603. Available at: [https://www.dzs.hr/Hrv\\_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx](https://www.dzs.hr/Hrv_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx)
4. Croatian Bureau of Statistics (CBS) (2019) Employment and Wages, 2018. Statistical report 1648. Available at: [https://www.dzs.hr/Hrv\\_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx](https://www.dzs.hr/Hrv_Eng/Pokazatelji/Zaposlenost%20i%20place/Zaposlenost%20i%20place%20-%20pregled%20po%20zupanijama.xlsx)
5. Croatian Bureau of Statistics (CBS) (2020). Databases, HR-STAT. Available at: [https://www.dzs.hr/Hrv/system/stat\\_databases.htm](https://www.dzs.hr/Hrv/system/stat_databases.htm)
6. Croatian Bureau of Statistics (CBS) (2020). Statistika u nizu: Zaposlenost i plaće - pregled po županijama (30. travnja 2020.). Available at: <https://www.dzs.hr/Hrv/publication/StatisticsInLine.htm>
7. European Commission DG MARE (2015) EMFF - country files: Operational Programmes 2014 – 2020. Available at: [https://ec.europa.eu/fisheries/sit+es/fisheries/files/docs/body/op-overview-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sit+es/fisheries/files/docs/body/op-overview-fact-sheet_en.pdf)
8. European Commission, Maritime affairs and Fisheries (2016). European Maritime and Fisheries Fund, Croatia Fact Sheet. Available at: [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-croatia-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-croatia-fact-sheet_en.pdf)
9. FINA (2018). Analiza financijskih rezultata poslovanja poduzetnika Republike Hrvatske po županijama u 2017. godini. FINA, Zagreb
10. FINA (2018). Osnovni financijski rezultati poslovanja poduzetnika po županijama i gradovima/općinama RH s pripadajućim rangovima\* u 2017. godini. FINA, Zagreb
11. Ministarstvo poljoprivrede (2019). Godišnji izvještaj o ribarskoj floti Republike Hrvatske u 2018. godini. Available at: <https://podaci.ribarstvo.hr/2019/12/01/godisnji-izvjestaj-o-ribarskoj-floti-republike-hrvatske-u-2018-godini/>
12. Ministry of Agriculture (2019). Annual report on balance between fishing capacity and fishing opportunities for 2018. Zagreb, Croatia. Available at: <https://podaci.ribarstvo.hr/files/Fleet-report-for-2018-Croatia.pdf>
13. Ministry of Regional Development and EU Funds (2018). Vrijednosti indeksa razvijenosti i

- pokazatelja za izračun indeksa razvijenosti jedinice područne (regionalne) samouprave. Available at: <https://razvoj.gov.hr/o-ministarstvu/djelokrug-1939/regionalni-razvoj/110>.
14. Ministry of Regional Development and EU Funds (2018). Vrijednosti indeksa razvijenosti i pokazatelja za izračun indeksa razvijenosti jedinice lokalne samouprave. Available at: <https://razvoj.gov.hr/o-ministarstvu/djelokrug-1939/regionalni-razvoj/110>.
  15. Scientific, Technical and Economic Committee for Fisheries (STECF) (2020) The 2020 Annual Economic Report on the EU Fishing Fleet (STECF 20-06), Publications Office of the European Union, Luxembourg, doi:10.2760/500525, JRC123089
  16. Scientific, Technical and Economic Committee for Fisheries (STECF) (2020) The 2020 Annual Economic Report on the EU Fishing Fleet, Annex. Carvalho, N., Prellezo, R., Guillen, J. (Ed.). Joint Research Centre (JRC), the European Commission's. Luxembourg EU. Available at: <https://op.europa.eu/en/publication-detail/-/publication/5f6c2c3e-3dbd-11eb-b27b-01aa75ed71a1/language-en/format-PDF/source-search>
  17. World Bank (2019). National Development Strategy Croatia 2030 Policy Note: Agriculture, Fisheries, and Food Processing in Croatia's Food & Bio-Economy.

#### 4.1. LIST OF TABLES

Table 1.	Main business indicators of trade enterprises in Croatia, County of Istria, and County of Zadar in 2018	22
Table 2.	Coefficients of variation (CV) for selected business performance indicators in the sea fishing sector	23
Table 3.	A proportion of sea fishing sectors in the total economy of Croatia, County of Istria, and County of Zadar in 2018	23
Table 4.	Business ratios of trade companies in Croatia, County of Istria, and County of Zadar in 2018	24
Table 5.	Fishing fleet in the Republic of Croatia and in Regional Units Pula and Zadar	25
Table 6.	Main indicators of the fleet by vessel length in Croatia and regional units Pula and Zadar in 2018	29
Table 7.	Basic data on the fleet by fishing technique in Croatia and regional units of Pula and Zadar in 2018	30
Table 8.	Catch of sea fish, crabs, shellfish and cephalopods in tonnes	31
Table 9.	Quantity of landings in Croatian sea fishing by main species 2016-2019	33
Table 10.	Value of landings in Croatian sea fishing by main species 2016-2019	34
Table 11.	Catch of sea fish by classes according to the vessel length in Croatia and the regional units Pula and Zadar in 2018	35
Table 12.	Catch of sea fish by types of fishing gear in Croatia and regional units of Pula and Zadar in 2018	36

Table 13.	Fishing days by vessel length classes in Croatia and regional units Pula and Zadar 2018	38
Table 14.	Fishing days by fishing technique in Croatia and regional units Pula and Zadar 2018	39
Table 15.	Rank of Croatia among 23 fishing fleets of the European Union according to selected socio-economic indicators	41
Table 16.	Employment indicators for the Croatian fishing fleet 2016-2018	42
Table 17.	Revenue indicators for the Croatian fishing fleet 2016-2018	43
Table 18.	Business indicators for the Croatian fishing fleet 2016-2018	43
Table 19.	Fishermen by number of active vessels, region and membership in cooperative	46
Table 20.	Surveyed fishermen by activities in which they use fishing equipment	47
Table 21.	Trends in the main indicators of fishing activity	50
Table 22.	Reasons why fishermen think that 2019 was worse than others	51
Table 23.	An overview of information on catch for surveyed fisherman	53
Table 24.	Number of fishermen and average share in total catch by type of fishing gear	54
Table 25.	Glavni ekonomski pokazatelji za anketirane ribare po područjima anketiranja/Main economic indicators of the interviewed fishermen by studied area	57
Table 26.	Number of customers by type - survey area and membership in the fishing cooperative	59
Table 27.	Buyers by average share in fishermen sales and number of fishermen they sell to - basic statistics	61
Table 28.	Statistics of the importance of purchasing factors for different buyers by region	62
Table 29.	Commentaries on changes in the interest on purchasing criteria	65
Table 30.	Frequencies of interviewees' suggestions on what types of fish and for which market should be promoted (by regions and membership in cooperative)	66
Table 31.	Frequencies of interviewees' suggestions on what aspects of fishery practice should be promoted by regions and membership in cooperative	67
Table 32.	Frequencies of interviewees' suggestions on fishery performance improvement by regions and membership in cooperative	67
Table 33.	Estimation of the expected effect of the introduction of the label of sustainable or ecological fishing - basic statistics	69
Table 34.	Expected impacts of the PRIZEFISH Project on business to fishermen associated with the project - frequencies	71
Table 35.	Expected impacts of the PRIZEFISH Project on business to fishermen that not associated with the project - frequencies	72

## 4.2. LIST OF GRAPHS

Figure 1.	Gross value added (GVA) of the fisheries sector and the share of this sector in the total GVA in the EU-28 and in Croatia 2014-2018	14
Figure 2.	Number of insured persons of the Croatian Pension Insurance Institute in Istria and Zadar County and the share of the number of insured persons from activity A Agriculture- forestry and fishing 2017-2019- situation as on 30/Nov	17
Figure 3.	Structure of insured persons by gender in total and in the fisheries sector- 11/2020	18
Figure 4.	Share of groups of small and large vessels by length in the Croatian fleet in 2018	27
Figure 5.	Fishing fleet by vessel length and fishing technique	28
Figure 6.	Structure of landings by quantity and value for main species of fish and other marine organisms in Croatia 2016-2019	32

## 5. ANNEXES

### 5.1 ANNEX 1: NATIONAL ACCOUNTS AGGREGATES BY INDUSTRY (UP TO NACE A\*64): TOTAL - ALL NACE ACTIVITIES

Last update 11.01.21  
 Extracted on 18.01.21  
 Source of data Eurostat  
 UNIT Current prices, million euro

<b>NA_ITE</b>	<b>Value added, gross</b>										
<b>M</b>	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GEO/TIME											
European Union - 27 countries (from 2020)	9,532,263	9,848,639	10,145,776	10,205,623	10,320,481	10,555,602	10,936,809	11,231,209	11,664,746	12,046,107	
European Union - 28 countries (2013-2020)	11,113,668	11,530,044	11,852,831	12,092,748	12,193,370	12,615,083	13,291,770	13,401,041	13,771,472	14,203,433	
Croatia	38,491	38,340	38,333	37,034	36,503	36,131	36,953	38,626	40,690	42,690	44,443
<b>NA_ITE</b>	<b>Compensation of employees</b>										
<b>M</b>	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GEO/TIME											
European Union - 27 countries	5,073,022	5,190,501	5,316,904	5,384,732	5,443,702	5,555,265	5,707,032	5,886,208	6,130,823	6,390,674	

(from 2020)											
European Union - 28 countries (2013-2020)	5,958,273	6,135,902	6,270,521	6,424,483	6,480,798	6,677,491	6,987,521	7,067,108	7,281,941	7,581,690	
Croatia	22,259	21,746	21,235	20,783	20,247	20,194	20,634	21,428	22,628	24,366	25,473
<b>NA_ITE M</b>	<b>Wages and salaries</b>										
GEO/TIME	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
European Union - 27 countries (from 2020)	3,971,661	4,067,690	4,168,385	4,221,009	4,267,953	4,354,656	4,486,853	4,637,662	4,835,676	5,054,248	
European Union - 28 countries (2013-2020)	4,710,162	4,844,483	4,954,855	5,071,302	5,117,446	5,285,698	5,553,493	5,617,148	5,785,980	6,041,542	
Croatia	19,133	18,666	18,229	17,959	17,528	17,291	17,650	18,488	19,548	21,135	22,184

## 5.2 ANNEX 2: NATIONAL ACCOUNTS AGGREGATES BY INDUSTRY (UP TO NACE A\*64): FISHING AND AQUACULTURE

Last update 11.01.21  
 Extracted on 18.01.21  
 Source of data Eurostat  
 UNIT Current prices, million euro

NA_ITEM		Value added, gross									
GEO/TIME	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
European Union - 27 countries (from 2020)	5,409	5,741	5,912	5,514	5,306	5,657	5,934	6,438	6,698		
European Union - 28 countries (2013-2020)	5,993	6,475	6,693	6,364	6,063	6,689	6,744	7,089	7,382		
Croatia	89	78	91	99	103	106	106	112	127	136	136.2
NA_ITEM		Compensation of employees									
GEO/TIME	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
European Union - 27 countries (from 2020)	2,266	2,260	2,314	2,212	2,205	2,292	2,365	2,422	2,544		
European Union - 28 countries (2013-2020)	2,446	2,471	2,530	2,481	2,414	2,596	2,722	2,725	2,846		
Croatia	44	42	41	41	42	45	45	49	54	58	60.7
NA_ITEM		Wages and salaries									
GEO/TIME	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
European Union - 27 countries (from 2020)	1,945	1,936	1,987	1,894	1,887	1,962	2,025	2,077	2,171		
European Union - 28 countries (2013-2020)	2,103	2,116	2,172	2,119	2,061	2,222	2,332	2,334	2,427		
Croatia	39	36	35	36	37	39	36	42	48	50	52.3



### 5.3 ANNEX 3: SURVEY QUESTIONNAIRE FORM




ANKETA br. \_\_\_\_\_  
 Datum: \_\_\_\_\_ 2020.

**SOCIO-EKONOMSKO ISTRAŽIVANJE NA PROJEKTU PRIZEFISH  
ANKETA RIBARA**

**Poštovani!**

U okviru projekta PrizeFish, financiranog iz EU programa Interreg V-A programa, provodi se socio-ekonomsko istraživanje. Temeljni cilj projekta je uvođenje inovativnih eko opskrbnih lanaca u ribarstvu, za plasman iadranskih ribljih proizvoda s dodanom vrijednošću. Projektom su obuhvaćeni ribari olivaričari i kočari s područja Zadarske županije i Istarske županije.

Anketa je anonimna a osobni podaci prikupljaju se radi eventualne potrebe za dodatnim informacijama ili pojašnjenjima prikupljenih podataka. Osobni podaci neće se nigdje pojedinačno objavljivati niti koristiti za druge svrhe osim za potrebe istraživanja.

Ljubazno vas molimo da sudjelujete u anketi.

**Područje:**  Pula  Zadar

1. Ime ribara ili naziv poduzeća: \_\_\_\_\_
2. Sedište: \_\_\_\_\_
3. Matična luka: \_\_\_\_\_
4. Telefon: \_\_\_\_\_ 5. E-pošta: \_\_\_\_\_

**A. OSNOVNI PODACI O POSLOVANJU**

6. Od kojih djelatnosti ostvarujete dohodak korištenjem ribarskih plovila i opreme?

- isključivo od ribolova  
 od ribolova i drugih djelatnosti povezanih s ribolovom, plovilima i opremom za ribolov.

7. Ako ostvarujete dohodak od drugih korištenja opreme osim ribolova, koji su to:

- korištenje plovila za usluge u turizmu i/ili ugostiteljstvu  
 korištenje plovila za ostale namjene (npr. tegljenje, prijevoz putnika, prijevoz vode...)  
 davanje plovila i/ili opreme u najam

8. Na koji način ugovarate posadu za rad na plovilima?

Označite vrste ugovaranja koje koristite i navedite broj članova posade prema vrsti ugovora:

- |  |  |
|--|--|
| <input type="checkbox"/> nemam zaposlenih na ugovor                          | <input type="checkbox"/> ugovor o dijelu .....         |
| <input type="checkbox"/> ugovor o radu .....                                 | <input type="checkbox"/> studentski ugovor .....       |
| <input type="checkbox"/> ugovor o sezonskom radu za privremene poslove ..... | <input type="checkbox"/> ostale vrste ugovaranja ..... |

8.1. Koje su to ostale vrste ugovaranja, ako ih ima:

\_\_\_\_\_

**9. Ostali podaci o poslovanju za 2019. godinu:**

Opis podatka	2019.	Trend 2015.-2019.
1. Broj aktivnih plovila		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
2. Broj dana na moru u godini		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
3. Ukupna količina ulova, t		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
4. Ukupni prihod od ulova u godini, kn		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
5. Broj stalno zaposlenih na puno radno vrijeme		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
6. Broj sezonskih radnika (grosiek, u sezoni)		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući
7. Prosječna bruto mjesečna plaća stalno zaposlenih članova posade, kn		<input type="checkbox"/> stalan <input type="checkbox"/> rastući <input type="checkbox"/> padajući

**9.1. Bilješke i komentari vezano uz pitanje 9 (ako ih je bilo):**

---



---

**10. Je li 2019. godina bila uobičajena što se tiče ribolova i ulova u odnosu na prethodne godine?**

Da  Ne

**11. Ako nije, u čemu se razlikovala u odnosu na prethodne godine?**

---



---



---

**12. Kojе riblje vrste lovite i koliko pojedina vrsta čini u ukupnom ulovu?**

Navedite do 7 najvažnijih vrsta i "ostalo"!

Vrsta	Ulovljeno t ili % ukupnog ulova
1.	
2.	
3.	
4.	
5.	
6.	
7.	
Ostalo	

**13. Koje alate koristite u ribolovu i koliko od ukupnog ulova ulovite pojedinim korištenim alatom?**

Alat	"+" ako koristi.	ti %	Alat	"+" ako koristi.	ti %
Povlačni alati:			Plivarica		
- pridnena koća;			Potegaća		
- pelagijska koća;			Tramata (ludar, zagonica i fružata)		
- obalna koćica;			Mreža stajačica		
- kogol i strašin;			Vrša i druge klopke		
- dredže			Udičarski alati (parangal i povraz)		
- hidraulična dredža - vongolara					

**B. TRŽIŠTE PRODAJE I PREFERENCIJE KUPACA**

**14. Koji su glavni kupci za vaš ulova?**

Navedite broj kupaca određene skupine, procijenu njihova udjela u količini ukupne prodaje i informacije koje držite bitnim za tu skupinu u (trend, preferirane vrste i sl.)

Kupci	Broj kupaca	Udjel u prodaji (%)	Bilješke o trendovima, sezonski, vrstama, ...
1. Veletrovcu na domaćem tržištu			
2. Veletrovcu na inozemnom tržištu			
3. Nacionalni (domaći) prerađivači ribe			
4. Inozemni prerađivači ribe			
5. Trgovački lanci na nacionalnom tržištu			
6. Trgovački lanci s inozemnog tržišta			
7. HORECA (hoteli, restorani, catering...)			
8. Ribarnice			
9. Ostalo ( _____ )			

**15. Kolika je važnost čimbenika kupnje navedenih u tablici kod kupaca s kojima radite?**

Ocijenite važnost pojedinog čimbenika za pojedine kupce. Zaokružite 1 ako čimbenik nije važan, 2 ako je važan i 3 ako je jako važan.

Čimbenik:	Vrste kupaca					
	Vele-trgovci	Prerađivači	Malo-prodaja	HORECA	Ribarnice i sl.	Ostali:
Cijena	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Ribolovni alat	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Sviežina	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Podrijetlo	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Širina asortimana	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Pouzdanost po kvaliteti i pravovremenosti	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Certifikat kvalitete proizvoda*	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

\* MSC (Marine Stewardship Council)

**15.1. Bilješke vezano uz pitanje 15. (ako ih ima):**

---



---

**12. Raste li interes za neki od navedenih čimbenika kod vaših kupaca?**

Ne  Da, i to za sljedeće čimbenike ili kriterije:

---



---

**17. Imate li neku ideju koje vrste ribe bi trebalo promovirati i na kojem tržištu?**

---



---

**C. PROMOVIRANJE, CERTIFICIRANJE I PROJEKT PRIZEFISH**

**18. Koje aspekte vašeg načina ribarenja bi trebalo promovirati?**

(očuvanja ribljih resursa, ekološki, tradicijski ribolov, sigurnost i kvaliteta prehrane lokalnog stanovništva, ....?)

---



---

**19. Kako bi se moglo unaprijediti ribarenje?**

---



---

**20. Kakav učinak bi uvođenje oznake održivog ili eko ribarenja moglo imati na različite aspekte vašeg ribarskog posla?**

- 3 jako negativan učinak ... 0 bez učinka ... 3 jako pozitivan učinak.

Aspekti	Očekivani učinak						
	negativan			pozitivan			
1. Ukupni prihod	-3	-2	-1	0	1	2	3
2. Cijena ribe	-3	-2	-1	0	1	2	3
3. Konkurentnost (u odnosu na druge ribare)	-3	-2	-1	0	1	2	3
4. Imidž ili reputacija	-3	-2	-1	0	1	2	3
5. Povezanost unutar lanca opskrbe	-3	-2	-1	0	1	2	3
6. Troškovi	-3	-2	-1	0	1	2	3
7. Administracija	-3	-2	-1	0	1	2	3
8. Vanjski nadzor (inspekcije i certifikati)	-3	-2	-1	0	1	2	3
9. Veze s istraživačkim organizacijama	-3	-2	-1	0	1	2	3
10. Upravljanje ribarstvom (a kvote, ograničenja, robolovni dani)	-3	-2	-1	0	1	2	3
11. Oprema i tehnologija ribarenja	-3	-2	-1	0	1	2	3

**20.1. Ako ih ima: dodatni komentari vezano uz pitanje 20.:**

---



---

**21. Za sudionike u projektu:**

**Kao sudionik projekta, koje ili kakve koristi imate ili očekujete od projekta PRIZEFISH?**

---



---

**22. Za ribare koji ne sudjeluju u projektu:**

*Kratki info o projektu PRIZEFISH:*

*U okviru projekta PRIZEFISH ribari koji su sudjelovali u projektu i njihove organizacije bili su kroz radionice i seminare uključeni u provođenje inovativnih postupaka izlova morskih proizvoda (npr. uvođenje pumpi za ribe na brodove), kreiranje inovativnih ribarskih proizvoda (npr. svieža srdela u inovativnoj zaštitnoj atmosferi (MAP) koja produžava rok trajanja za 12 dana, burger od kozjica) te promocije oznake ARFM (Jadransko održivo ribarstvo).*

**Koje su, po vama, koristi od projekta PRIZEFISH za ribare koji su sudjelovali u njemu?**

---



---

**Najbolje zahvaljujemo na uloženom trudu i vremenu.**

Završeno u: \_\_\_\_\_ sati

## 5.4 ANNEX 4: MAIN BUSINESS INDICATORS OF THE CROATIAN MARINE FISHING FLEET

Variable name	unit	2016	2017	2018	o 2018 to 2017	o 2018 to avg. 14-17	Trend 14-18
Number of vessels	number	7.746	8.349	7.731	-7,40%	7,20%	
<b>Employment</b>							
Variable name							
Engaged crew	number	7.227	7.813	7.820	0,09%	20,72%	
Full time employees	number	3.009	3.023	3.122	3,27%	15,05%	
Engaged crew/Vessel	number	1	1	1	8,09%	10,49%	
Personnel cost per member	EUR	6.944	7.502	8.451	12,65%	18,67%	
<b>Revenue</b>							
Variable name							
Gross value of landings	EUR '000	58.443	55.936	59.579	6,51%	0,45%	
Annual revenue	EUR '000	83.834	88.262	95.282	7,95%	11,66%	
Annual revenue / Vessel	EUR	10.823	10.572	12.325	16,6%	-1,6%	
<b>Results</b>							
Variable name							
Gross Value Added	EUR '000	30.474	48.476	51.418	6,07%	30,42%	
Gross Value Added / Vessel	EUR	3.934	5.806	6.651	14,5%	16,1%	
Gros profit margin	%	0,0%	26,2%	25,4%	-2,93%	71,03%	
Return o physical assets	%	-5,8%	3,4%	5,4%	57,49%		