

# **SOCIO-ECONOMIC ANALYSIS OF FISHING ENTERPRISES IN THE BLACK SEA REGION**

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**This Project was carried out upon the request of and was financed by the Fisheries Department of the Directorate General of Protection and Control under the Ministry of Agriculture and Rural Affairs.**

## **PREFACE**

The Black Sea is the most productive fishing zone in Turkey. In 1995-2004 period, 74.5% in average of the total marine fisheries production came from the Black Sea.

The aim of this project was to make a socio-economic analysis of the fishing enterprises in the Black Sea Region for the fishing period of 2004-2005.

Balance between fishing power and fish stocks must be achieved for the optimum utilisation of the resources in terms of sustainable fisheries. Any policies that will be made to accomplish this end will be based on the socio-economic data concerning fishermen. Thus, laying a sound basis is meaningful to allow both the fishermen and the decision-makers to take the right steps.

What was aimed with this project of the Agricultural Economic Research Institute was to provide data to the Ministry for its future studies on fishing. This project is the first leg of the activities which try to bring forth the socio-economic characteristics of the fishermen operating in our seas.

It was conducted upon the request of the Fisheries Department of the Directorate General of Protection and Control (DG Protection and Control) and was financed by the said Department. The purpose is to provide the DG Protection and Control with the data needed by it to make the arrangements during the alignment process with the EU.

There are total 7412 fishing vessels in the Black Sea Region. In this project, 308 fishing vessels in 18 districts and in 8 provinces were examined.

The project is divided into four main sections: technical and physical features of the fishing fleet; socio-economic characteristics of fishermen; economic analysis of fishing activities; views of fishermen concerning fishing. Further, an evaluation of the Excise Tax relief in fuel applicable in the fishing period of 2004-2005 is given.

**Hüsnü EGE**  
**Institute Deputy Director**

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Project Team

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## SUMMARY

The aim of this project was to make a socio-economic analysis of the fishing activities in the Black Sea Region.

The fishing vessels operating in the Black Sea Region were examined in two categories: length category; operational type category (type of fishery). While the length category contained the fishing vessels of 8 m and less than 8 m in length, of 8-12 m, 12-20 m, 20-30 m in length, and of 30 m and more than 30 m in length; the type category contained the coastal fishing (small-scale fishery) and medium-scale fishery (purse-seiner, trawler, trawler-purse seiner). The analyses were made on these two categories.

The analysis of the selected fishing vessels in the Black Sea Region has revealed that the vessels are 4.00-62.00 m in length and that while 82.14% of the vessels are coastal fishing vessels, 17.86% of them are medium and large-scale fishing vessels. Out of the medium and large-scale fishing vessels, 6.82% are purse-seiners, 9.09% are trawlers, and 1.95% are trawler-purse seiners.

Based on the observations, the coastal fishing vessels in the Black Sea Region are 4.00-17.45 m in length, they have a total average capital of YTL 10,551, they have an average fishing income of YTL 6,113, and the crew expenses constitute the highest expense item with a rate of 46.84%. 57.31% of the fishermen, which is a considerably high rate, have completed only their primary education and are covered by the social security system of the Social Security Institution (SSK).

Regarding the purse-seiners operating in the Black Sea Region, the vessels are 12.12-62.00 m in length, they have a total average capital of YTL 1,044,857, they have an average fishing income of YTL 148,464, and the crew expenses constitute the highest expense item with a rate of 40.90% as observed for coastal fishing. 52.38% of the fishermen, which is also a considerably high rate, have completed only their primary education and are covered by the social security system of the Social Security Organisation for Artisans and the Self-Employed (BAĞ-KUR).

Regarding the trawlers operating in the Black Sea Region, the vessels are 12.12-27.50 m in length, they have a total average capital of YTL 183,714, they have an average fishing income of YTL 36,407, and the crew expenses constitute the highest expense item with a rate of 39.12% as observed for both coastal fishing and the purse-seiners. 67.86% of the fishermen, which is also a considerably high rate, have completed only their primary education – the only category where there is no trawler owner who holds a university degree – and are covered by the social security system of BAĞ-KUR.

Regarding the trawler-purse seiners operating in the Black Sea Region, the vessels are 14.00-27.00 m in length, they have a total average capital of YTL 304,667, they have an average fishing income of YTL 30,324, and the crew expenses constitute the highest expense item with a rate of 41.68% as observed for all the categories. 83.33% of the fishermen, which is quite a high rate, have completed only their primary education and are covered by the social security system of BAĞ-KUR as in purse-seiners and trawlers.

As another finding of the research, a majority of the fishermen in the Black Sea Region, i.e., 62.34%, has been found to be a member of a fisheries co-operative.



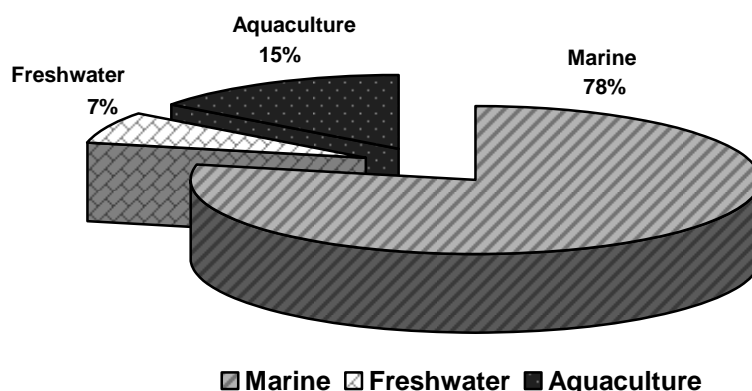
## 1. INTRODUCTION

Turkey has a rich potential in terms of fisheries production, with its coastline of 8,333 km on three seas, which have different ecological characters; 33 rivers having a total length of 178,000 km; more than 200 natural lakes; 168 dams; and more than 750 ponds. Despite this rich potential, the volume of fisheries production was 644,492 t., as indicated by the 2004 statistics, of which 504,897 t. came from marine capture fisheries (78.34%), 45,585 t. from freshwater capture fisheries (7.07%) and 94,010 t. from aquaculture (14.59%) (Table 1.1, Figure 1.1).

**Table 1.1.** Capture fisheries and aquaculture production of Turkey (t)

Years	Capture fisheries					Aquaculture	Total
	Marine			Freshwater	Total		
	Fish	Other fish	Total				
1995	557,138	25,472	582,610	44,983	627,593	21,607	649,200
1996	451,997	22,246	474,243	42,202	516,445	33,201	549,646
1997	382,065	22,285	404,350	50,460	454,810	45,450	500,260
1998	413,900	18,800	432,700	54,500	487,200	56,700	543,900
1999	510,000	13,634	523,634	50,190	573,824	63,000	636,824
2000	441,690	18,831	460,521	42,824	503,345	79,031	582,376
2001	465,180	19,230	484,410	43,323	527,733	67,244	594,977
2002	493,446	29,298	522,744	43,938	566,682	61,165	627,847
2003	416,126	46,948	463,074	44,698	507,772	79,943	587,715
2004	456,752	48,145	504,897	45,585	550,482	94,010	644,492

Source: Anonymous 1997-2005



**Figure 1.1.** Breakdown of fisheries production of Turkey for the year 2004 by production types (%)

Fisheries production of Turkey is for the great part based on capture fisheries, which in turn is mainly based on marine capture fisheries. Coastal fishing is the biggest source of the marine capture fisheries. So far, high seas fishery has not had a place in production due to lack of necessary infrastructure. The marine capture fisheries have indicated significant fluctuations in recent years because of pollution, ecological changes and over-fishing (Atay and Korkmaz 2001 a, Seçer et al. 2005).

In Turkey, with the incentives and subsidies provided to the fisheries sector, the capture fisheries sector showed a rapid growth toward late 1980s. This rapid growth in the

capture fisheries sector led to a continuous increase in the catch amounts, which stopped in 1989 when the amount of marine fish catches - mainly anchovy - decreased (Atay et al. 2000, Atay and Korkmaz 2001 a, Seçer et al. 2005).

The incentives and subsidies provided led to the improvement of fishing gear and increased the number of fishing vessels, as well. Behind the growth of the fishing fleet were the facilities brought forth by the “Decree on the Customs Exemption” No. 7/4318 of 1972, and by the “Law on the Improvement of Maritime Trade Fleet and Promotion of Ship Building Facilities” enacted in January 1982, and the Ziraat Bank’s loans granted to the fishermen (Şahin 1984).

The fishing fleet continued to grow also in the last 10 years and the number of vessels rose from 9,710 in 1995 to 17,953 in 2004 by an increase rate of 90.96% (Table 1.2).

**Table 1.2.** Breakdown of the fishing vessels in Turkey by regions (ea.)

Years	Breakdown of the fishing vessels by regions						Total
	Black Sea			Marmara	Aegean	Mediterranean	
	Eastern	Western	Total				
1995	3,044	1,211	4,255	1,901	2,329	1,225	9,710
1996	2,789	1,344	4,133	1,877	2,309	1,271	9,590
1997	2,654	1,389	4,043	1,799	2,331	1,567	9,740
1998	2,642	1,426	4,068	1,950	2,348	1,657	10,023
1999	2,876	2,284	5,160	2,723	4,340	1,574	13,797
2000	2,761	2,167	4,928	3,006	4,068	1,379	13,381
2001	2,585	2,159	4,744	2,733	4,119	1,393	12,989
2002	4,301	2,713	7,014	3,238	5,023	2,421	17,696
2003	4,588	2,733	7,321	3,007	6,021	2,193	18,542
2004	4,420	2,766	7,186	2,951	5,712	2,104	17,953

Source: Anonymous 1997-2005

The incentives and exemptions provided led not only to the growth of the fishing fleet but also to the growth of their lengths and engine powers (Table 1.3).

**Table 1.3.** Breakdown of the fishing vessels in Turkey by engine power and length (HP)

Years	Engine Power (HP)						Total	Length (m)			
	0	1-9	10-19	20-49	50-99	100+		1-4.9	5-9.9	10-19.9	20+
1995	289	2,637	2,643	1,699	882	1,560	9,710	277	7,584	1,393	456
1996	211	2,478	2,501	1,941	1,008	1,451	9,590	142	7,432	1,547	469
1997	245	2,439	2,573	1,897	749	1,837	9,740	148	7,599	1,483	510
1998	195	2,621	2,673	1,759	790	1,985	10,023	226	7,709	1,579	509
1999	25	4,512	2,915	2,816	1,370	2,129	13,797	127	11,160	1,998	512
2000	2	3,852	3,073	2,629	1,255	2,570	13,381	163	10,594	2,018	606
2001	-	3,556	3,413	2,892	1,149	1,979	12,989	60	10,524	1,824	581
2002	-	7,571	3,434	3,117	1,498	2,026	17,696	372	14,571	2,231	522
2003	-	9,197	3,085	3,096	1,445	1,629	18,542	472	15,586	1,930	554
2004	132	7,612	3,119	3,500	1,717	1,873	17,953	260	15,467	1,654	572

Source: Anonymous 1974-2004

The growth of the fishing vessels in terms of length and engine power was an outcome of the customs exemptions given under the Decree on the Customs Exemption No. 7/4318 and the Law No. 2581, and of an incentive of the State Planning Organisation (SPO). Being



subject to the Decree No. 7/4318, the fishermen imported engines up to 200 HP as well as fishing nets, sonar, eco-sounders and radios without paying any duties, taxes and levies. Further, the Law No. 2581 allowed for a customs exemption to the import engines having a power more than 200 HP and the ship equipment (all kinds of machinery, equipment and fixtures), which would be given by the Department of Incentives of the SPO under the Prime Ministry upon the consent of the Ministry of Agriculture and Rural Affairs (Şahin 1984).

Following the growth of the fishing fleet as a result of the incentives and subsidies, a tendency toward over-fishing has arisen in order to reach the level of catch amounts per vessel of the former years. This has resulted in periodical fluctuations in production lasting more than one year. This situation of the Turkish fisheries implies that, with the current fishing fleet, the maximum sustainable yield (MSY) level of our fisheries resources has been achieved and that the volume of capture fisheries production cannot be increased further (Oray et al. 1997, Anonymous 2001, Atay and Korkmaz 2001 a).

Following 1988, the capture fisheries sector saw licensing restrictions based on the assumptions that a continuous increase in the catch amounts could not be possible through a continuous increase in fishing power. Moreover, in the frame of alignment with the EU, in 2001 the fishing vessels more than 12 m in length were subjected to a regulation in that they had to keep the records of their catches in order to have a direct control on the fishing power and to lower the over-fishing pressure on the fish stocks (Atay and Korkmaz, 2001 a, Seçer et al. 2005).

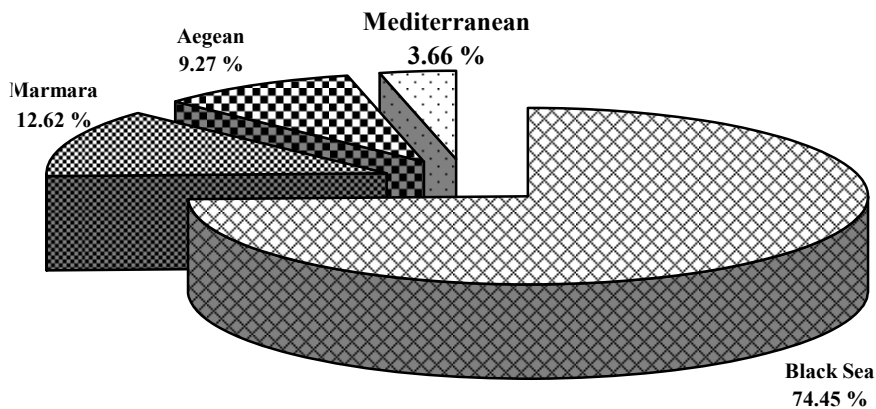
### 1.1. General Characteristics of the Fishery in the Black Sea Region

The Black Sea is a very important fishery resource in terms of both supplying the highest portion of the catches and creating job opportunities for majority of the local people. 74.452% in average of the marine captures fisheries production came from the Black Sea according to the statistics for the period of 1995-2004. It was followed by the Sea of Marmara (12.62%), the Aegean Sea (9.27%), and the Mediterranean Sea (3.66%) (Table 1.4, Figure 1.2).

**Table 1.4.** Breakdown of the Turkish marine catches by regions (t)

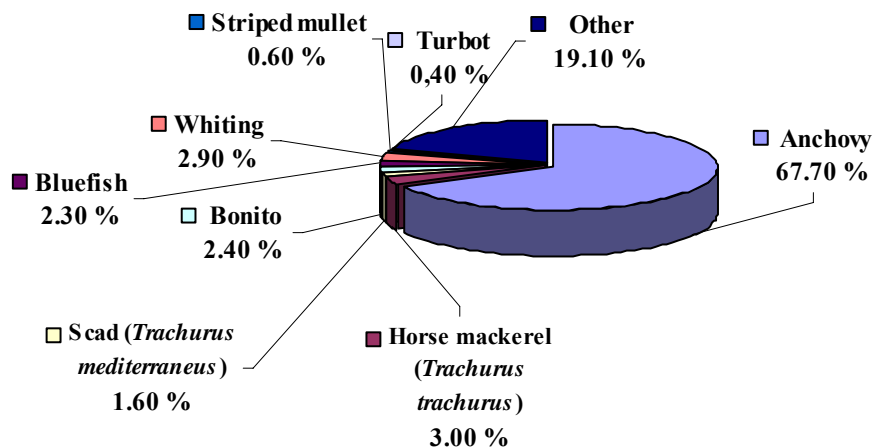
Years	Black Sea			Marmara	Aegean	Mediterranean	Total
	Eastern	Western	Total				
1995	295,143	146,916	442,059	35,288	51,995	27,796	557,138
1996	226,456	121,157	347,613	42,097	40,493	21,794	451,997
1997	193,696	71,855	265,551	52,885	41,735	21,894	382,065
1998	200,019	60,526	260,545	63,530	69,210	20,615	413,900
1999	323,328	48,118	371,446	81,005	40,548	17,001	510,000
2000	243,417	97,595	341,012	46,137	40,242	14,299	441,690
2001	221,690	121,073	342,763	68,327	42,996	11,094	465,180
2002	251,818	130,229	382,047	68,047	32,559	10,793	493,446
2003	204,754	107,132	311,886	60,925	31,483	11,832	416,126
2004	233,084	118,129	351,213	60,640	33,946	10,953	456,752
Average	239,340	102,273	341,613	57,888	42,521	16,807	458,829
%	52.16	22.29	74.45	12.62	9.27	3.66	100.00

Source: Anonymous 1997-2005



**Figure 1.2.** Average volume of the Turkish marine capture fisheries production in the period of 1995-2004 (t)

By the period of 1995-2004, the breakdown of the Turkish catches by fish species is as follows: anchovy (*Engraulis encrasicolus*) 67.70%; horse mackerel (*Trachurus trachurus*) 3.00%; scad (*Trachurus mediterraneus*) 1.60%; whiting (*Merlangius merlangus*) 2.90%; bonito (*Sarda sarda*) 2.40%; bluefish (*Pomatomus saltator*) 2.30%; striped mullet (*Mullus barbatus*) 0.60%; turbot (*Scophthalmus maeticus*) 0.40%.



**Figure 1.3.** Breakdown of the Turkish marine catches in the period of 1995-2004 (%)

The anchovy is the dominant species of the Black Sea in terms of both economic and ecological aspects, and the biggest portion of the anchovy landings is from the Eastern Black Sea fisheries. Anchovy constitutes the biggest portion of the Turkish fisheries landings. The volume of anchovy landings is more than half of total marine fisheries landings. The greatest portion of the anchovy is landed (91.01%) from the Black Sea fisheries (Table 1.5).

**Table 1.5.** Breakdown of the Turkish anchovy landings by years (t)

Years	Black Sea			Marmara	Aegean	Mediterranean	Total
	Eastern	Western	Total				
1995	270,080	103,702	373,782	11,226	2,566	-	387,574
1996	191,849	81,390	273,239	14,534	2,907	-	290,680
1997	170,500	43,280	213,780	23,007	4,213	-	241,000
1998	163,241	32,755	195,996	19,773	12,231	-	228,000
1999	294,342	16,459	310,801	36,962	2,237	-	350,000
2000	218,028	42,642	260,670	14,986	4,344	-	280,000
2001	201,949	86,667	288,616	21,998	9,386	-	320,000
2002	235,398	101,021	336,419	25,641	10,940	-	373,000
2003	186,173	79,896	266,069	20,279	8,652	-	295,000
2004	214,572	92,084	306,656	23,372	9,972	-	340,000
<b>Average</b>	<b>214,613</b>	<b>67,990</b>	<b>282,603</b>	<b>21,178</b>	<b>6,745</b>	-	<b>310,526</b>
<b>%</b>	<b>69.11</b>	<b>21.90</b>	<b>91.01</b>	<b>6.82</b>	<b>2.17</b>	-	<b>100.00</b>

Source: Anonymous 1997-2005

Based on the fisheries statistics for the period of 1995-2004, out of the dominant pelagic fish species, 91.00% in average of anchovy, 60.30% of horse mackerel, 49.60% of scad, 78.80% of bonito and 56.50% of bluefish, and out of the demersal fish species, 88.80% of whiting, 41.10% of striped mullet and 92.20% of turbot were landed from the Black Sea Fisheries (Table 1.6)

**Table 1.6.** Landings of fish species from the Black Sea fisheries and their share in the production of Turkey (%)

Fish Species	Average Production in 1995-2004 (t)			Production in 2004 (t)		
	Turkey	Black Sea	Share (%) (*)	Turkey	Black Sea	Share (%) (*)
Anchovy	310,525	282,603	91.00	340,000	306,656	90.00
Horse mackerel	13,749	8,285	60.30	18,068	6,301	35.00
Scad	7,434	3,688	49.60	9,337	2,812	30.00
Bonito	11,086	8,739	78.80	5,701	4,693	82.00
Bluefish	10,318	5,828	56.50	19,901	11,135	56.00
Whiting	13,532	12,014	88.80	8,205	7,243	88.00
Striped mullet	2,876	1,182	41.10	1,848	668	36.00
Turbot	1,599	1,475	92.20	376	274	73.00
Total	371,120	323,815	87.30	53,316	11,431	21.00
Other fish	87,710	17,799	20.30	456,752	351,213	77.00
<b>Total</b>	<b>458,829</b>	<b>341,614</b>	<b>74.50</b>	<b>340,000</b>	<b>306,656</b>	<b>90.00</b>

(\*) Share %: (Black Sea/Turkey)\*100

Source: Anonymous 1995-2004

There are 7,412 licensed fishing vessels operating in the Black Sea Region. Out of these fishing vessels, 15.00%, 12.00%, 11.00%, and 10.00% are registered in Trabzon, İstanbul, Rize and Zonguldak, respectively. Also, out of these fishing vessels, 88.00% are coastal fishing vessels while 3.00%, 2.00% and 7.00% are purse-seiners, trawlers and trawler-purse seiners, respectively. Trabzon has the highest number of coastal fishing vessels (1,060 vessels). On the other hand, İstanbul and Rize have the highest number of purse-seiners (55 and 50 vessels, respectively). While Samsun has the highest number of trawlers (41 vessels), İstanbul has the highest number of trawler-purse seiners (210 vessels) (Table 1.7).

**Table 1.7.** Breakdown of the fishing vessels in the Black Sea Region by type of fishery (Amount)

Vessel Licence	Artvin	Rize	Trabzon	Giresun	Ordu	Samsun	Sinop	Kastamonu	Bartın	Zonguldak	Sakarya	Kocaeli	İstanbul*	Kırklareli	Total
Coastal fishing vessel <sup>1</sup>	215	794	1,060	628	649	377	484	256	279	712	102	151	622	214	<b>6,543</b>
Purse-seiner <sup>2</sup>	2	50	35	12	37	2	1	-	-	-	-	3	55	-	<b>197</b>
Trawler <sup>3</sup>	-	-	2	-	11	41	9	1	-	2	4	18	28	20	<b>136</b>
Trawler-Purse seiner <sup>4</sup>	2	5	51	15	17	75	35	7	19	31	36	22	210	11	<b>536</b>
<b>Total</b>	<b>219</b>	<b>849</b>	<b>1,148</b>	<b>655</b>	<b>714</b>	<b>495</b>	<b>529</b>	<b>264</b>	<b>298</b>	<b>745</b>	<b>142</b>	<b>194</b>	<b>915</b>	<b>245</b>	<b>7,412</b>

<sup>1</sup> Fishing vessels marked as “D” which generally use entangling nets and longlines, fish for sea snail in a local fishing area, and are commonly called small-scale fishing vessels.

<sup>2</sup> The fishing vessels that are only used for purse-seining. The vessels marked as “GY” are also included in this category.

<sup>3</sup> The fishing vessels that are licensed for only trawling. The vessels marked as “TD” are also included in this category.

<sup>4</sup> This category includes the fishing vessels marked as “GT”, “TG” and “TGD”.

Source: Records of DG Protection and Control

In the Black Sea Region, the licensed fishing vessels are 2.60-62 m in length and have an engine power of 4 to 7830 HP (Table 1.8)

**Table 1.8.** Length and engine power of the fishing vessels in the Black Sea Region by type of fishery

Licence	N	Length (m)			Engine Power (HP)		
		Min.	Max.	Average ± SE	Min.	Max.	Average ± SE
Coastal fishing vessel <sup>1</sup>	6,543	2.60	18.00	6.64±0.02	4	440	29.14±0.48
Purse-seiner <sup>2</sup>	197	8.30	62.00	22.84±0.78	14	7,830	671.28±63.10
Trawler <sup>3</sup>	136	8.50	24.90	15.09±0.30	32	886	196.89±9.97
Trawler-Purse seiner <sup>4</sup>	536	8.52	46.00	19.96±0.29	45	4,200	359.65±14.80
<b>Total</b>	<b>7,412</b>	<b>2.60</b>	<b>62.00</b>	<b>8.19±0.06</b>	<b>4</b>	<b>7,830</b>	<b>74.01±2.47</b>

<sup>1</sup> Fishing vessels marked as “D” which generally use entangling nets and longlines, fish for sea snail in a local fishing area, and are commonly called small-scale fishing vessels

<sup>2</sup> The fishing vessels that are licensed for only purse-seining. The vessels marked as “GY” are also included in this category.

<sup>3</sup> The fishing vessels that are licensed for only trawling. The vessels marked as “TD” are also included in this category.

<sup>4</sup> This category includes the fishing vessels marked as “GT”, “TG” and “TGD”.

Source: Records of DG Protection and Control

Table 1.9 gives the breakdown of the licensed fishing vessels in the Black Sea Region by length and type categories.

**Table 1.9.** Breakdown of the fishing vessels in the Black Sea Region by length and type categories

Length (m)	N	Types of Fishing Licence			
		Coastal fishing <sup>1</sup>	Purse-seiner <sup>2</sup>	Trawler <sup>3</sup>	Trawler-Purse seiner <sup>4</sup>
<8	5,331	5,331	-	-	-
8-12	1,201	1,150	28	10	13
12-20	506	62	59	110	275
20-30	285	-	59	16	210
≥30	89	-	51	-	38
<b>Total</b>	<b>7,412</b>	<b>6,543</b>	<b>197</b>	<b>136</b>	<b>536</b>

<sup>1</sup>Fishing vessels marked as “D” which generally use entangling nets and longlines, fish for sea snail in a local fishing area, and are commonly called small-scale fishing vessels

<sup>2</sup>The fishing vessels that are licensed for only purse-seining. The vessels marked as “GY” are also included in this category.

<sup>3</sup>The fishing vessels that are licensed for only trawling. The vessels marked as “TD” are also included in this category.

<sup>4</sup>This category includes the fishing vessels marked as “GT”, “TG” and “TGD”.

Source: Records of DG Protection and Control

## 1.2. Importance of the Research

With the start of bilateral screenings as a part of the EU accession talks with Turkey, agriculture emerged as the area that would receive the highest consideration in that process. Under the agriculture, the Fisheries will be dealt with as a separate Chapter, focusing mainly on the capture fisheries. There has been a need for studies to provide information about the structure and situation of the fisheries sector to the related public authorities during their activities for the structural and legal alignment of the fisheries sector with the EU.

To this end, this project was designed upon the request of the Fisheries Department of the DG Protection and Control in order to provide the said Department with technical, social and economic data on the capture fisheries sector, together with the further studies to be executed in the Aegean, Mediterranean and Marmara Regions.

Since there is only a limited number of studies on the fishery economy in Turkey, each study will at the same time serve as a foundation for later studies.

Although the Black Sea Region supplies the highest proportion of catches and makes the biggest contribution to both the capture fisheries sector and the national fisheries sector in terms of value, and creates job opportunities for the local people in other areas than fishing with the emergence of fishery-related activities, and although the fish meal and oil factories established in the region are the only sources which supply raw materials to the fish handling and processing facilities; a detailed study with which the socio-economic structure of the fisheries sector can be revealed has not been carried out so far. Yet, in line with the EU accession talks with Turkey, which have already begun, the Turkish fisheries sector needs several regulations to achieve integration with the EU fisheries sector.

For successful regulations and measures in the fishery sector, we must firstly know the structure of the sector. So far, in Turkey, there have been no detailed studies to bring to view the structure as well as socio-economic characteristics of the fishery sector. The existing studies generally show a local character. It will be hard for any management policies to be successful and achieve the set goals if such are applied without knowing the characteristics of the fishermen and the fishing activity. These kinds of studies are frequently conducted in many countries of the world. Because every management policy that is applied has varying

impacts on the fishermen and the fishery sector. Demonstration of the socio-economic structure of the fishery and the fishermen is needed both before and after the application of every policy in order to see whether the policies applied are adequate or not.

For successful regulations and measures to achieve integration of the Turkish fishery sector with the EU fishery sector, the structure of the fishing fleet, its physical and technical features as well as socio-economic characteristics of the fishermen and fishery must be determined.

### **1.3. Purpose of the Research**

This research was designed to determine the physical and technical features of the fishing fleet as well as the socio-economic situation of the fishing activities and the fishermen in the Black Sea Region, which has the largest share in the Turkish fishery sector. Further, it was aimed to collect the data that would provide guidance for the policies to be implemented, the regulations to be made/planned to be made and/or the measures to be taken by the fisheries administration (DG Protection and Control of the Ministry of Agriculture and Rural Affairs since there is no fisheries authority in real sense in Turkey).

### **1.4. Scope of the Research**

In this research, the following will be determined: the technical and physical features of and the fishing activities (fish species landed, and amount of landings) by the licensed fishing vessels in the provinces bordering the Black Sea according to length and type categories (length, age, engine power, gears); socio-economic characteristics of the fishermen (household size, age, education level, civil status, number of children, vessel ownership, residence ownership, professional experiences, input sources of fishermen and household based on fishing and non-fishing activities, capital structures and expenditures, gross receipts from fishing activity, gross product, net receipts, gross profit, fishing income, profitability, etc.); the problems that the fishermen encountered. In addition, the recommendations for the resolution of those problems were included. Further, which fish species the gross receipts of the fishermen are based on will be determined, and from these fish species, the total volume of landings of Black Sea fisheries will be estimated.

The research results will shed a light on the making and application of fisheries management policies of the fisheries administration.

## **2. LITERATURE SUMMARY**

Turkey offers a rich potential in terms of fisheries, with its coastline of 8,333 km on three seas and approximately 20,000 fishing vessels. However, there is little, if not any, research on the socio-economic analysis of the fishing activities. Whereas, for an effective and sustainable fisheries management, the fisheries policies must be based on the socio-economic data concerning the fisheries sector.

Although there have been numerous studies on the socio-economic characteristics of fishery in several countries in the world when compared with Turkey, where there are only limited number of studies, the literature researches are given under two headings: the researches in the world and the researches in Turkey.

### **2.1. Researches in the world**

Drewes (1982) examined the socio-economic situations of the three fishing communities near Madras (India), with reference to the role and status of women in the economy of those communities. At the end of the research, Drewes determined the socio-economic situation of the women engaged in marine fishery activities, their participation in production activities and whether those activities provided a starting input for the women or not.

Charles (1988) stated that an effective fisheries management should be formulated on social goals and objectives, which in turn would only be achievable if being natural components of the political development the proper policies and regulations were in place, and discussed the socio-economic impacts of the fishery policies and regulations. Charles explained that it was the obligation of the fishery policy-makers to strike a balance among the several objectives, and that the highest yield from a single fish species that was added to the sector in the long term was equal to the biological maximum sustainable yield (MSY) from a stable fish stock.

Charles (1989 a) examined the small-scale fishery in the artificial coral reefs in the North America, as well as its socio-economic characteristics.

Charles (1989 b) examined the optimum fishery management systems considering the transformation of fishing communities and labour forces and the fish population dynamics, together with the decisions on the management, asserting that the examinations on the fish population dynamics had a limited place in the fishery models.

Hunte and Oxenford (1989) made an economic analysis of the vessels fishing for pelagic species in the Barbados Island in the Caribbean Sea. In their study, Hunte and Oxenford made a comparative analysis of the catch amounts, capital investments and operating expenses of the fishing vessels used for both day and night fishing and determined the favourable and unfavourable aspects of those vessels.

Saxena (1989), regarding the setting and use of the economic parameters necessary for an investment decision for the utilisation of the living aquatic resources of India, made a general economic analysis of the Indian fisheries sector and provided the data that would help the governments and investments in decision-making process.

Lalande and Dube (1990) determined that the coastal fishing exhibited a continuous downward trend and that the decrease in the catches of some fish species having an economic value caused a 17% drop in the income of the fishermen due to the poor performance of the vessels less than 35 ft in length in coastal fishing in Quebec (Canada) during the period of 1987-1989.

Steele (1990) found out in the profitability analysis of the fishing fleet operating in the Western Newfoundland region in Canada that the fleet had an economic profitability at the rate of 3.4%.

An anonymous author (1991) examined the technical, economic and socio-economic characteristics of the small-scale marine fisheries of the Bay of Bengal (Madras, India) and laid down the economic performance of fisheries. In the aforesaid study, it was found out that since the job opportunities in agriculture are limited the local people, mainly the Muslims, work as crew members on board the fishing vessels and are paid on catch share basis, that with the development of fishery the majority of the Muslims own the fishing vessels and the share paid to the crew members is determined at a certain percentage of the remaining catch value after deduction of the operating expenses (fuel, ice, nutrition of the crew members) of the fishing activity, that the share varies from one region to another and according to catch type and fishing year, and that the most common practice of share distribution is as follows: the master and the owner of the net 60% of the catch value and the crew members 40% of the catch value, after deducting the operating expenses. It was observed that in the fishing villages even when a small family group engages in fishing, the others take part in the handling process of landed product in different ways and assume some works at certain phases of the process.

Chhaya et al (1991) made an economic analysis of the small-scale fishery on the coasts of the Gujarat State of India where trawls and entangling nets are used, and determined that that type of fishery provides higher net income with a reduced operating expense and it is economically sustainable.

Charles (1993) described the necessary tools and techniques to determine the socio-economic characteristics of small-scale fishery and advised the use of Lorenz curves and Gini coefficients to examine the expenditures and the distribution regarding correctness of expenditures, stating that the socio-economic surveys had the basic aim of collecting data about the input sources of a fishing community and household based on fishing and non-fishing activities, and the distribution of inputs, fixed capital and expenditures, as well as the demographic data such as age and family size.

Béné (1996) examined the fishing strategies (choice of a combination of fishing nets, target species and geographical area) applied to shrimp fishing in French Guiana and the dynamic indicators (investments-share of power, fishing power, number of the scrapped vessels) of the fishing fleet and said that a fishing strategy was a combination of various criteria for decision-making ascribed to fishermen who would be adapted to a specific fishing behaviour. Béné determined that what was the question that should be answered was that how the behaviour of fishermen would be, why and how they would assume that type of behaviour and came to a conclusion that the answer to the aforesaid question would first be the determination of the fishermen's behaviours and then the analysis of the factors that influenced the fishermen's choice of behaviour.



Freire and Garcia-Allut (2000) laid down following a survey on the coastal fishing in the Galicia Region of Spain the socio-economic and biological causes of the failure of the management applications in the European commercial fishery and recommended alternative policies for research and management for the commercial coastal fishing.

Sadra (2000) made a survey on the technical and physical features as well as economic performance of the vessels fishing for deep water pink shrimp in the Mediterranean (Spanish coasts, Italy, Portugal) including the North Africa (Algeria, Tunisia, Morocco). Collection of data was carried out through port visits, which were made 1-2 times a week to the selected 31 ports in the Western and Central Mediterranean. Based on the data collected, the findings were as follows: the shrimp fleet consists of trawlers and multi-purpose vessels equipped with trawls; the fishing vessels sampled in the North Africa were much bigger in length (21 m in length in average) than those in the Mediterranean; average engine power varies between 243 kW and 66 GRT; while the European shrimp vessels in the Mediterranean have an engine power of 245 kW in average, the African shrimp trawlers have an engine power of 231 kW; while a trawler in the North Africa is of 62 GRT in average, the European vessels are of 67 GRT in average; the shrimp trawlers of Spain and Italy account for 7% and 73% of all trawlers respectively; the variation is the result of heterogeneity of the sampled ports; the shrimp trawlers of Portugal account for 93% of all trawlers; there is only one trawler used for fishing in the visited coasts; all the trawlers in Morocco and Tunisia are shrimp trawlers; the shrimp trawlers of Morocco are used for fishing all the shrimp species; deep water pink shrimp is not the only species they fish for; the Tunisian fleet consisting of 8 vessels are mainly used for deep water fishing in the Sicily Channel; only 60% of the Algerian trawlers are used for fishing deep water pink shrimp throughout the year; the difference between the income and expenditures (the remaining after the deduction of the fixed and variable values) is the depreciation of the investment capital and it has to be used to offset the opportunity cost; the highest profit gain is from the areas where the fishing fleet is managed at the industrial level; a correct analysis will be possible when a relation is established between the fishing power data and the economic variations; and for the better management of deep water pink shrimp fishery in the Mediterranean, the following must be done:

- To collect reliable statistical data to have strong regulations;
- To adapt such supplementary observation measures as the development of new methods with which the actual engine powers can be measured and making regular estimations of landings;
- To redesign the fleet to reduce its capacity, and to increase efficiency to improve the economic situation of the remaining vessels of the fleet;
- To conduct studies on the dynamics of the resources for a continuous utilisation and a better management; and
- To take utmost care when using the data from the official statistics to make estimations.

Supongan et al (2000) made a survey on the socio-economic characteristics of anchovy fishery in the period of 1993-1994 and in 1997, as well as the socio-economic characteristics of the fishermen and the owners of the small-scale processing facilities in Songkhla (Thailand) in 1996.

Zen et al (2000) made a survey on the socio-economic characteristics of the fishing with lampara nets and pelagic (drift) gillnets in the fisheries sector in the province of Western Sumatra (Indonesia). Surveys were made among 45 fishermen using lampara nets and another 66 using drift gillnets who are small-scale fishermen operating in area of one or more nautical miles away from the shore, however, 10 surveys made with the fishermen using lampara nets

were not evaluated due to insufficient data. Drawn from those surveys were that the fishermen using drift gillnets were operating in an area of 18 km away from the shore, that one cruise lasted around 13 hours, that in average 276 cruises were made in a year, and that those using lampara nets, on the other hand, were operating in area of 13 km away from the shore, that one cruise lasted in average 9 hours and in average 218 cruises were made in a year. Further findings were as follows: while 40% of the fishermen using drift gillnets are vessel owners, 76% of those using lampara nets are vessel owners; while the vessels using drift gillnets vary between 7-13 m in length (11.78 m in average), those using lampara nets between 6.5-15 m in length (11.08 m in average); while the vessels using drift gillnets are of 6.8 GT, those using lampara nets are of 2.8 GT; while the vessels using drift gillnets are 6 years old, those using lampara nets are 7; the vessels using drift gillnets are bigger in length and newer than those using lampara nets; 93% and 32% of the vessels using drift gillnets and lampara nets, respectively, were purchased by their owners; public loan was used for the purchase of 63% the vessels; the vessels using lampara nets have a higher engine power (29.11 HP in average) than that of the vessels using drift gillnets (23.29 HP in average); 93% of the engines of the vessels using lampara nets are new and are financed by the owners of the vessels; however, 76% of the vessels using pelagic gillnets have a new engine, which is purchased through public loan; the vessels using pelagic gillnets have a fishing net length between 1800-7200 m (3752 m in average) a mesh size of 8.81 cm in average; the lampara nets are shorter, whose length is between 100-400 m (204.27 m in average); the lampara nets have different mesh sizes on the codend and on the wings; the wings have a bigger mesh size; both vessels fish for small pelagic species and both vessels reach the level of management and adaptation; while out of the surveyed fishermen using pelagic gillnets, 60% have completed only their primary education, 33,3% secondary education, 6.7% graduated from a high school, 0.0% holds a university degree; out of the surveyed fishermen using lampara nets, 60% have completed only their primary education, 20% secondary education, 18.2% have been graduated from a high school, and 1.8% hold a university degree; the number of household members of both groups of fishermen is in average 3.56 person and 3.87 person, respectively; out of the fishermen using pelagic gillnets and the fishermen using lampara nets, 93% and 90%, respectively, earn their income only from fishing activities; and the remaining amount of the gross receipts after deduction of the operating expenses are shared by the owners of the net and the crew members on 50:50 basis.

Franquesa et al (2001) advised the use of some social and economic parameters for fishery resource or fisheries sector (physical efficiency of the vessel, physical efficiency of the capacity, physical efficiency of the power, physical yield of the vessel per hour, capacity yield, power yield, vessel's yield per hour, physical yield of the fishermen and his average wage, average price of landings, investment capital, labour expenses, opportunity cost, gross benefit, net benefit, profitability ratio, added gross value) since a great deal of challenges were arisen in the Mediterranean as in many other fishing zones due to the fact that the fish species caught were very different and the market demand was high in the places where the actual control of the volume of landings of the similar fisheries in the Mediterranean was occasional.

Sumaila et al (2001) made a comparative analysis of the small and large scale fishery of Norway and Canada in the North Atlantic. In the aforesaid comparison, Sumaila et al employed the following parameters: types and lengths of the active fishing vessels of Norway and Canada; amounts of landings of both the small-scale and large-scale fishing vessels; proportion of the landings that is used for direct human consumption; proportion of landings that is gone to the fish meal and oil industry; catch value; number of fishermen; number of

fishermen per US\$ 1 million of investment; average fuel consumption for 1 tonne of landed products. Further, the other parameters were used for socio-economic analysis of fishing.

Tietze et al (2001) examined the physical and technical features, as well as fishing activities and socio-economic characteristics of the fishing fleets of China, Korea, Thailand, Indonesia, India and Senegal, Norway, Germany, France, Spain, Antigua and Barbuda, Barbados, Trinidad and Tobago, Argentina, and Peru.

Virtanen et al (2001) examined the regional socio-economic importance of the freshwater and coastal fisheries of Finland. In the aforesaid survey conducted in provinces, based on the parameters like the number of registered fishermen in inland waters and in the coastal area by provinces as of 1997, the fish species caught, the annual production, the value of landings, the total value of fishery and its share in the national economy, it was found out that the 80% of the total value of fishery came from marine capture fisheries, that the traded fish had a greater volume than that of the production, that the fishery appeared as the main industrial sector in more than half of Finland, and that despite its low contribution to the national economy, the fishery was regionally important.

Waters et al (2001) made face-to-face surveys among the randomly selected vessel owners or operators to collect economic data on the financial status of the commercial fishermen operating in the coral reefs of Florida Keys and to employ the collected data for the examination of the economic impacts of the various fishery regulations in the future regarding the commercial fishery in the coral reefs. In the aforesaid surveys, Waters et al brought to view the socio-economic characteristics of fishery based on the data about the fishermen themselves, their fishing vessels, their investments in the fishing vessels and gears, background of their fishing activities, physical features of the fishing vessels, average catch amounts, and average income and expenditures.

Colloca et al (2003), based on the facts that the commercial fishery had an important place in the Cilento (Italy) region, that the fishing activities on the Italian coasts exhibited a downward trend in the last two decades, that there were no quantitative data available on fishing, that the development factors were not known well but had a link with the establishment of the new integrated management plans, made a survey to collect data where they examined the technical features of the fishing fleet (structure of the fleet, features of fishing nets, catch data, fishing power data) and the socio-economic characteristics of fishery (age of fishermen, their professional experiences, value of landings, fishery inputs, expenditures, income, etc.).

Sabatella and Franquesa (2003) mentioned the sampling technique and showed the basic procedures to be employed to the socio-economic surveys and the design of the surveys in a study on sampling methods for the determination of socio-economic indicators, which was initiated by the Economic and Social Sciences Sub-committee of General Fishery Commission of the Mediterranean Scientific Advisory Committee.

Kong (2004) made a survey on the Jamaican fisheries sector (numerical size of the fishing fleet, construction materials, number of fishermen, time at sea, household population of fishermen, education level of fishermen, and membership in a co-operative), collected data on the management, development and regulation of fishery and determined the strategies.

Kronen (2004) examined the socio-economic characteristics of the small-scale professional coastal fishing in order to highlight the socio-economic shift in the Kingdom of Tonga (South Pacific) due to its importance in the transition from a change of goods system to a cash system. The survey was made on four main fishermen's groups (from simple fishing to carrier boats with engine that use multiple fishing nets) in three main geographical areas and appeared to have been important in that it revealed the limitations to the conventional economic analyses. While the net present value (NPV) emerged as a useful instrument for making comparisons between the fisheries and alternative income sources, it was not applied to the small-scale fishery systems in Tonga in every case. It was found that the yield was increased as the fishing activity changed from hook fishing to the system using multiple fishing nets. The NPV values for the four different fishery systems were determined to have varied from 0.34 to 15.96 when the labour expenses were excluded, but from -3.78 to 13.22 when the labour expenses were included, and it was concluded that the income from the commercial coastal fishing was very sensitive to the labour expenses.

Villareal et al (2004) examined the empirical key parameters to observe the impacts of the management measures taken for the socio-economic improvement of the fishing communities on the fishing activities toward the coastal and aquatic resources and to identify the socio-economic and demographic issues, problems and opportunities in terms of the management of coastal and aquatic resources. Regarding the fishery and the coastal improvement in the Philippines and Southeast/ South Asia countries, Villareal et al described using two samples from the USA and Italy the data collection methods and the use of socio-economic and demographic indicators for the management of coastal and aquatic resources.

Teh et al (2005) made a survey on the initial profile identification and the estimation of ecological and socio-economic sustainability of the reef fishery in the waters of Sabah in Malaysia, where they determined the structure of the fishing community, reef fishery, retail sale places and prices, average fishing income, and collected the necessary data.

Tietze et (2005) made surveys in the period of 2002-2003 to determine the fishing effectiveness and economic performances of the biggest 94 fishing fleets in terms of marine capture fisheries in 13 countries from the South America, the Caribbean, Europe, Africa and Asia, where they found out that all of the 94 types of fishing vessels had positive gross cash flow and met their operating expenses entirely, and that when the investment capital was the case out of the aforesaid vessels, 88 of them, i.e., 94%, provided net benefit after deduction of the depreciation costs and interest expenses. Comparison of fishing fleets of the countries revealed meaningful developments in financial and economic performance due to the limitation and reduction of fleet capacity in the Republic of Korea, Germany and Argentina.

Tzanatos et al (2005) used for the purposes of the examination of the small-scale fishery of Greece both the data in the fishery records and the data obtained from the face-to-face survey with 551 fishermen at 121 ports. At the end of the evaluation of that data, the following were demonstrated: the fisheries sector has had 19052 small-scale fishing vessels and 29.000-35.000 fishermen until the end of 2002; the number of both the vessels and the fishermen exhibited a downward trend in the last decade; the small-scale fishery saw a meaningful shift in terms of its social importance; totally 17 fishing nets were used and 62 fish species were subject to the fishing activities; the fishery showed variations with respect to fishing nets, target species, place and season; the fishing activity was seasonal in different regions; the results of the cluster analyses verified the heterogeneity and complexity of the small-scale fishery sector.

## 2.2. Researches in Turkey

Çelikkale and Ulupınar (1995) determined the income and expenditures for the fishing period of 1989-1990 of two purse-seiner sets of 6 vessels in total which consist of the vessels more than 20 m in length and the carrier boats less than 16 m in length and are used mainly for fishing anchovy and tuna in the Black Sea, and examined their profitability.

Genç (1998) made a survey on the economicality in the fishing periods of 1996-1997 and 1997-1998 of the fishing vessels of different designs in the Eastern Black Sea, and found out that in the fishing period of 1996-1997 the small-scale fishing vessels were more profitable than the large-scale fishing vessels of the Eastern Black Sea operating in the Aegean and the Mediterranean, however, in the fishing period of 1997-1998 the latter were more profitable due to the weak anchovy stocks in the Black Sea.

Ünal et al (1998) made a survey on the fishing activities of the trawlers registered in the port of Foça in İzmir, their physical and technical features, fishing zones, as well as on the income distribution and the problems of fishermen. The research data was collected from the face-to-face surveys with 37 fishermen who are trawler owners. From the data collected, the following were identified: the trawlers registered in the port of Foça in İzmir had a catch yield of 224 kg/vessel/day in average in the fishing period of 1997-1998; the fishing activities were carried out by four fishermen in average including the master; the crew members are paid monthly on share basis; payment of shares is made as follows: from the gross receipts the necessary deductions (broker, assistant, municipal taxes, withholding tax, and Defence Industry Support Fund) - i.e., 16% -, as well as the deductions for ship chandlery, fuel oil, ice and transportation costs are made and of the remaining amount, 2/3 is reserved as vessel share and 1/3 is distributed to the master and the crew members in equal proportions; although the master in many cases is the owner of the vessel, he receives the same amount of share with that paid to a crew member; the fishery co-operative is not effective much; the fishing power has grown compared to previous years; the fishing vessels from the Black Sea which operate in the area under the free entrance regime create a challenge for the local vessels. Based on the aforesaid findings, it was advised that the powers in the fishery management area should be transferred to the local authorities and that every region should be subject to a different licensing system.

Hoşsucu et al (2001) examined the functioning and problems of the İzmir fisheries sector in 10 fishery centres and laid down the data on the number of fishing vessels, the species caught, the catch composition and marketing.

Ünal (2002) examined the profitability of the investments in trawlers for the fishing period of 1999-2000, dividing 20 trawlers operating in Foça in İzmir into 3 groups (n=5, n=8 and n=7) in terms of length. Ünal found the values of economic profitability, financial profitability, capital turn-over ratio, IKO and pay-back period as 6-129.4%, 8.9-75.6%, 2.7-79.7%; 7.5-116.4%, -30.1-62.3%, 35.4-71.0%; 30.0-239.0%, 31.8-162.6%, 48.9-205.3%; 18%, 38%, 21%, and 2.7 years, 5.5 years and 4.8 years for Group I, Group II and Group III trawlers, respectively. In addition, NPV was determined to have been NPV<0 for all of the three groups.

Ünal (2003) drew the following conclusions: the small-scale fishermen working on half-time basis in Foça (İzmir) are those who carry out fishing activities as a secondary

occupation and the retired persons; out of 15 fishing vessels, 3 use fishing hooks and 12 use entangling nets; while all of the hook fishers have completed only their primary education, among those fishermen using entangling nets there are graduates of both the secondary schools and high schools; one of the hook fishers and three of those fishermen using entangling nets are lease holders; all of the hook fishers and two of those fishermen using entangling nets are single; regarding the hook fishers, the household population varies from 4 to 6 persons, excluding the fishermen, and regarding those fishermen using entangling nets, from 0 to 4 persons, excluding also the fishermen; hook fishers and those fishermen using entangling nets are at an average age of 57.6 and 46.1, respectively, and have a fishing experience of 16.6 years and 33.8 years, respectively; while the hook fishers spend 193.6 days (day/year) at sea, those fishermen using entangling nets spend 121.6 days (day/year) at sea; average fuel consumption is 641 l/year for hook fishing and 538 l/year for the fishing with entangling nets; all the fishing vessels earn income below the level of the current interest limit (38.47%); fishery is not a profitable and economically sustainable activity.

Ünal (2004) examined the socio-economic characteristics of the trawling in Foça in İzmir and made a study of economic and financial performance of trawlers. For 20 trawlers in Foça, Ünal demonstrated the following: the vessels are 15-24 m in length (21 m in average); they are 4-57 years old (17.3 years in average); they have an engine power of 13-600 HP (324 HP in average); there are 3-5 crew members on board the vessels (4 crew members / vessel in average); 110-270 days spent at sea in a year (182 days in average); fuel consumption per vessel is 20-94.5 t. in a year (47.5 t./vessel/year); gross income is US\$ 18100-2597000 per vessel; 25% of the trawlers cannot meet their operating expenses and suffer losses; fuel expenses account for 41.3% of the operating expenses. Further, it was stated that the amount of fuel expenses is more than six times the amount in the EU.

### 3. MATERIAL AND METHOD

#### 3.1. Material

##### 3.1.1. Research material

##### 3.1.1.1. Research area

The research was done in an area encompassing 8 provinces (İstanbul, Sakarya, Düzce, Zonguldak, Sinop, Samsun, Trabzon and Rize) bordering the Black Sea in the Black Sea Region and 18 districts from those provinces (Figure 3.1).



Figure 3.1. Map of the research area

##### 3.1.1.2. Fishing vessels

The fishing vessels registered in the fishermen shelters in the selected provinces and districts formed the research material.

##### 3.1.1.3. Survey forms

Survey forms were used to collect the data on the physical and technical features of fishing vessels, socio-economic characteristics of fishermen, and economic analysis of fishing activities.

### 3.1.1.4. Public institutions

The Fisheries Department of the DG Protection and Control under the Ministry of Agriculture and Rural Affairs and the Trabzon Central Fisheries Research Institute provided the general information about the Black Sea fishery and the preliminary data on the fishing activities in the Black Sea Region.

## 3.2. Method

### 3.2.1. Defining of sample size

Simple random set sampling method was used to calculate the sample size to be taken from the Black Sea Region. To this end, firstly, the distribution by provinces of 7,412 fishing vessels, which are licensed by the DG Protection and Control under the Ministry of Agriculture and Rural Affairs and registered in the fishermen shelters, was made. Considering the opinions of the Fisheries Department of the Ministry of Agriculture and Rural Affairs and the Fisheries Research Institute and based on the distribution variance obtained, 8 indicative fisheries provinces in the Black Sea Region, together with the indicative fisheries districts from those provinces were selected in terms of fishing activity, number of fishing vessels, and features of fishing vessels. The following equation was used to calculate the sample size to be taken among 4,899 fishing vessels, which are registered in the fishermen shelters in the indicative provinces:

$$n = \frac{N * \sigma^2}{(N - 1) \sigma^2 \sigma_x^2 \pm \sigma^2} \dots\dots\dots(1)$$

Where,

N:	Population size
n:	Sample size
$\sigma^2$ :	Population variance
$\sigma_x^2$ :	Sample variance

The sample size that must be taken from 8 provinces was calculated as 291 fishing vessels from the first equation given above. The following equation was used for the distribution of sample size by provinces:

$$n_h = \frac{N_h}{N} * n \dots\dots\dots(h=1,2,3,\dots,8)\dots\dots\dots(2)$$

Where,

$N_h$ : Population size (total number of the fishing vessels in the indicative provinces), and  
 $n_h$ : Sample size (number of vessels) to be taken from each province (set)  
 (Yamane, 2001) (Table 3.1).



**Table 3.1.** Indicative provinces and districts, number of fishing vessels, and sample size

Provinces	İstanbul	Sakarya	Düzce	Zonguldak	Sinop	Samsun	Trabzon	Rize
Districts	Şile	Karasu	Akçakoca	Centrum	Gerze	Terme	Centrum	Ardeşen
	Sarıyer			K. Ereğlisi	Centrum	Centrum	Araklı	Pazar
						Dereköy	Çarşıbaşı	Çayeli
						Yakakent		
<b>Number of fishing vessels (N) in the indicative provinces and sample size (n)</b>								
N	915	142	76	745	529	495	1148	849
n	37	10	6	51	31	42	78	59

Sample size was found as 314 due to the rounding of the fractional numbers to the next higher number when distributing the sample size to the groups formed by length and type (small or medium/large-scale fishery) categories having calculated the sample size to be taken from each province (Table 3.2).

**Table 3.2.** Population size, calculated sample size, and distribution of sample size by length category

Length (m)	Population size (N)	Sample size (n)	Actual sample size (n <sub>G</sub> )
< 8	5331	193	187
8-12	1201	61	61
12-20	506	26	26
20-30	285	24	24
≥ 30	89	10	10
<b>Total</b>	<b>7412</b>	<b>314</b>	<b>308</b>

At the survey phase, 314 indicative enterprises were surveyed; however, 6 surveys which contained lacking or wrong information were not included in the assessment. 308 surveys were assessed. All of the lacking surveys consisted of the coastal fishing vessels, which are less than 8 m in length.

### 3.2.2. Data collection method (Face-to-face survey)

Survey forms were used to collect data since the fishermen did not keep detailed accounting records, they were reluctant to open the records for examination, and since it was not possible to collect collective data on the production, expenditures, capital structure and labour, which was necessary for economic analyses. Therefore, face-to-face surveys were made with the same number of fishermen as the selected vessels.

Survey forms were prepared in line with the scope of the research in light of the survey forms used for various researches previously, the Fisheries Statistics published by SIS, the opinions of the Fisheries Department of the DG Protection and Control under the Ministry of Agriculture and the Trabzon Central Fisheries Research Institute, and the data collected from a preliminary survey, which was applied with the help of the staff members from the aforesaid Institute.

### 3.2.3. Defining the technical and physical features of fishing fleet

Survey forms were prepared in line with the topics mentioned by Sabatella and Franquesa (2004) and as anonymous (2004) and with the opinions of the Fisheries Department of the DG Protection and Control under the Ministry of Agriculture and Rural Affairs, the Trabzon Central Fisheries Research Institute and the research personnel to collect data on the length, type of use, age, engine power, construction material, ownership status, type of purchase of the fishing vessels operating in the Black Sea Region, as well as on the fishing nets, equipment and electrical devices that those vessels use.

### 3.2.4. Defining the socio-economic characteristics of fishermen

Survey forms were prepared in line with the topics mentioned by Sabatella and Franquesa (2004) and as anonymous (2004) and with the opinions of the Fisheries Department of the DG Protection and Control under the Ministry of Agriculture and Rural Affairs, the Trabzon Central Fisheries Research Institute and the research personnel to determine the socio-economic characteristics of the fishermen in the Black Sea Region including the age, civil status, household population, number of children, educational level, activities relating to fishery and non-fishery activities, home and car ownership status, social security status, fishery experience, choice of occupation and working conditions.

### 3.2.5. Tables and graphics

Two different methods were employed to prepare the tables and to draw the graphics. All the values in the tables are expressed in %, and the sum of the values for the length and the type of fishery each is 100.00%. In the tables, the sum of the rows is equal to the proportion of the length or type of fishery within the sum of values. The values of the Medium and Large-scale Fishery Total reflect the total shares of purse-seiners, trawlers and trawler-purse seiners within the whole.

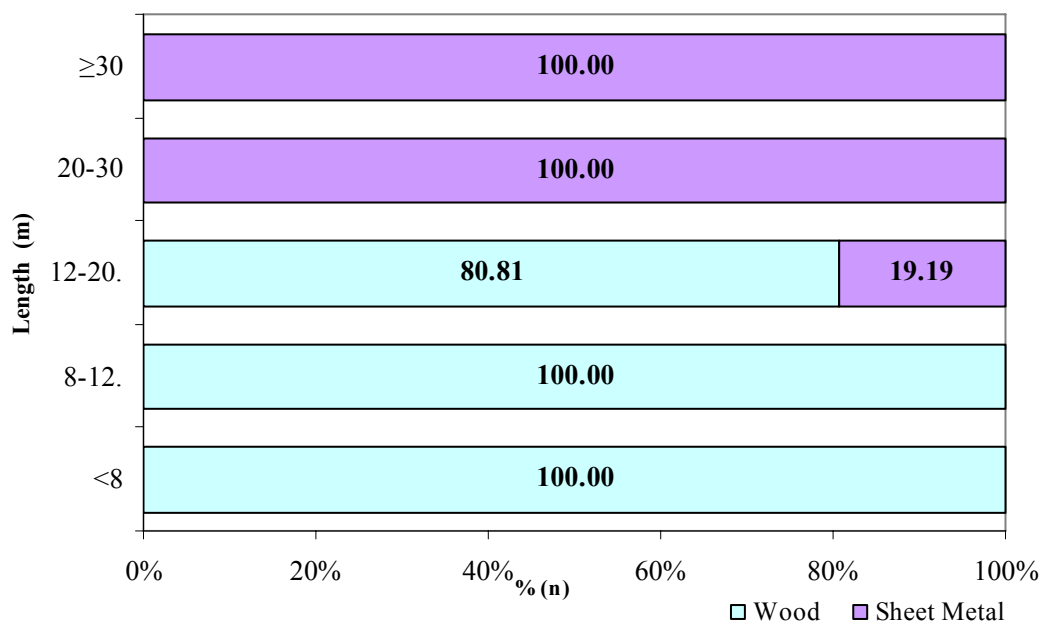
**Sample Table:** The sum of each row is equal to the proportion of the samples within the sum of values. The sum of the values for the length or the type of fishery is 100.00%.

**Sample: Table 4.5.** Breakdown of the construction materials of fishing vessels by length and type categories (%)

Length (m)	Construction material		Total	
	Wood	Sheet metal		
<8	60.71	-	60.71	
8-12	19.81	-	19.81	
12-20	6.82	1.62	8.44	
20-30	-	7.79	7.79	
≥30	-	3.25	3.25	
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery		<b>81.82</b>	<b>0.32</b>	<b>82.14</b>
Medium/ Large scale fishery	Purse-seiner	1.62	5.20	6.82
	Trawler	3.25	5.84	9.09
	Trawler-Purse seiner	0.65	1.30	1.95
Medium/ Large Scale Fishery Total		<b>5.52</b>	<b>12.34</b>	<b>17.86</b>
<b>Overall average</b>		<b>87.34</b>	<b>12.66</b>	<b>100.00</b>

On the other hand, the assessment of each length category or type of fishery is depicted graphically. In the graphics, the sum of each row is 100.00%.

**Sample Graphic:** In this graphic, the sum of each length category is 100.00%. The graphical values are also tabulated and given as additional tables.



**Sample: Figure 4.4.** Breakdown of the construction materials of fishing vessels by length category (%)

In the tables showing the values, each row gives the average values in the category. In those tables, the Medium and Large Scale Fishery Total reflects the weighted average of purse-seiners, trawlers and trawler-purse seiners.

**Sample: Table 4.54** Gross profit of fishing vessels by length category and type of use (YTL)

Length (m)	Gross receipts	Variable costs	Gross profit	
<8	15,035	9,129	5,906	
8-12	27,516	18,410	9,106	
12-20	76,096	54,087	22,009	
20-30	318,175	230,544	87,631	
≥30	1,478,192	1,035,421	442,771	
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery	19,075	12,152	6,941	
Medium/ large scale fishery	Purse-seiner	889,949	637,208	252,741
	Trawler	149,274	101,333	47,941
	Trawler-Purse seiner	198,681	138,464	60,217
Average of Medium/ Large Scale Fishery	437,467	309,990	127,477	
<b>Overall average</b>	<b>93,788</b>	<b>65,337</b>	<b>28,451</b>	

### **3.2.5. Economic analysis of fishing activity**

#### **3.2.5.1. Population and labour**

Since the family members of fishermen do not take part in production as in agriculture, calculation of labour from household population was not made. When examining the population structure of the family, all the members of the family were taken into account, however, for the calculation of labour and return from work of family labour, the labour of the fisherman and the family members, if any, working with the fisherman was considered.

#### **3.2.5.1. Capital structure of fishermen**

##### **3.2.5.1. Active capital**

Active capital reflects all the resources utilised by the enterprise for the production. Regarding the agricultural enterprises, since the farmer's house is situated within the work site and since the house extensions are used as animal shelter, depot, garage, penthouse, etc., all these are evaluated as a capital item (Erkuş et al 1995).

However, since the fisherman's house is not located in the place of production (fishery), it is not a capital item regarding fishery. Therefore, the fishermen's active capital was examined in two groups: fishing capital and monetary capital.

##### **3.2.5.1.1. Fishing capital**

The fishermen's fishing capital was examined also in two groups: vessel capital and capital of fishing gear. In addition, the fishing nets were examined in proper groups in line with the type of fishery to which the vessels belong.

##### **3.2.5.1.1.1. Vessel capital**

When examining the fishing vessel's capital, only those vessels used for fishing were taken as basis since the main boats account for the great proportion of the total vessel capital. Those accompanying boats which the fishermen reported other than the main boats are either operated or owned by the fishermen. The total vessel capital comprises all the fishing vessels, regardless of whether they are owned or hired by the fisherman. The total vessel capital is calculated as follows: the value of the hired fishing vessels and/or carrier boats plus the value of the fisherman's own vessel and/or vessels minus the value of the leased vessel – i.e.,

$$\text{Total Vessel Capital (G)} = (A+B+D)+(C+E) - F.$$

Where,

- A : Value of the main boat
- B : Fishing vessel owned
- C : Fishing vessel hired
- D : Carrier boat owned
- E : Fishing vessel hired
- F : Value of the vessels leased

(A+B+D) : Value of the vessel owned (owned by the fisherman)  
(C+E) : Value of the vessels hired

### **3.2.5.1.1.2. Capital of fishing nets and other fishing gear**

It was calculated by adding the values obtained by multiplying the average number of fishing nets and other gears on board the fishing vessels by length and type categories by their monetary values.

### **3.2.5.1.1.3. Electrical devices and equipment**

It was calculated by adding the values obtained by multiplying the average number of electrical devices on board the fishing vessels by length and type categories by their monetary values.

### **3.2.5.1.2. Monetary capital**

Monetary capital is the most dynamic group of the operating capital. That is to say, it has the highest liquidity. An enterprise has to have an adequate amount of monetary capital, which is quite effective on the maintenance of the operations of the enterprise, to be able to operate successfully (Gündoğmuş 1993). An inadequate amount of monetary capital will force the enterprise to purchase production input under inconvenient conditions or take high interest loans. Monetary capital of an enterprise consists of its receivables and cash on hand (Anaç 2005). In an agricultural enterprise, to have a monetary capital which accounts for 5% of the fixed capital is desirable (Eraktan 1995).

### **3.2.5.2. Passive capital**

In an agricultural enterprise, passive capital reflects the resources of active capital. In fact, the assets consist of own resources and foreign resources Equity capital is found by subtracting the foreign resources (debts) from the active capital (Erkuş et al 1995).

## **3.2.6. Financial and economic analysis of fishing activity**

### **a) Gross receipts**

Gross receipts are the total amount received from the sale of fish species landed (Shang 1981, Panayotou 1982). For the calculation of the gross receipts, the value of the portion of the catch consumed both by the fishermen and crew members during fishing and their families. The gross receipts were calculated using the following equation:

$$G.R. = \sum_{i=1}^n Y_i * P_i$$

Where,

G.R: Gross receipts

$Y_i$ : catch amount of species  $i$

$P_i$ : unit price of species  $i$

i: number of marketable species in the catch (i=1, 2, 3, ..... ) (Panayotou 1982).

### b) Operating expenses

Operating expenses were examined in two groups: fixed expenses not depending on production volume; expenses which vary (increasing or decreasing) depending on production volume (Shang 1981, Erkuş et al 1995, Atay and Korkmaz 2001).

**Table 3.3.** Variable expense items in fishery

Fuel		End-of-season maintenance
Ice purchased		Repair of net
Crates purchased		Water, electricity
Labour costs	Food purchased	Transportation cost
	Working clothes	Repair of motor vehicle
	Labour costs	Commissions and fees

Labour costs consist of employees' wages (crew members and carriers) and in kind expenditures spent on employees (food, working clothes, boots, etc.). Remuneration is generally in the form of a salary for the carriers and of catch share for the crew members. Catch share is determined according to every fisherman's own statement. Remuneration is calculated in a manner so as to include both salaries and catch shares, which are paid in cash, and in kind expenditures spent on employees including food, working clothes, etc.

For the calculation of fuel costs, the monetary value was taken into account rather the amount of fuel. For the situations where the fuel amount consumed was based on when making calculations, the price of fuel was taken as 1.65 YTL/L for those not subject to Excise Tax relief as period average and as 0.65 YTL/L for those subject to Excise Tax.

Fixed operating expenses comprise depreciations, wage allowances for the fisherman and his children working as crew members on board the vessel (those who live with the fisherman and who are dependent on the fisherman), as well as membership dues to associations, co-operatives, etc. and rent of shelters and vessels.

**Table 3.4.** Useful life and depreciation rates of fishing gear

Fixtures subject to depreciation	Useful life (Year)	Depreciation rate (%)
Wood vessel	25	4
Sheet metal vessel	30	3.3
Entangling nets	6	17
Trawl nets	6	17
Purse-seines*	20	5
Electronic devices like radar, sonar, etc.*	15	6.67

Source: Ünal, 2001

(\*): Collected from the fishermen operating purse-seiners.

The straight line method (Shang 1981, Atay and Korkmaz 2001) was used to calculate the depreciation values of the fixtures that are subject to depreciation. When calculating the values and useful lives of the fixtures that are subject to depreciation, a separate depreciation

was not calculated since the parts like engine, windlass, door, etc. are supplementary components of the vessel and they have a useful life around to that of the vessel. Their depreciation values were calculated together with the vessel. The depreciation value of electronic devices was calculated separately since they have shorter useful lives than the vessel. When calculating the depreciation value of the vessels, the value of devices were not included in the value of the vessel (because the value of those devices are deemed incorporated in the value of the vessel).

Wages of the fishermen was calculated over their catch shares. The amount of wage was found by adding 1 person (wage of the owner) to the number of crew members for purse-seiners and trawlers. For coastal fishermen, catch share was determined according to the fisherman's own statement since that type of fishery has a different catch share system. Wages of the family members working as crew members on board the vessel were calculated over the catch share and according to average of the group.

### **c. Gross product**

In agriculture, gross product is calculated by adding non-operating income, if any, and house rental to the revenues from the sale of agricultural products. Non-operating agricultural income is defined as the income earned from the use of farmers and mechanical powers in non-enterprise agricultural works (Kılıç 1997).

Gross product of fishermen was calculated by adding non-fishing revenues, if any, to sales revenues. Non-operating (non-fishing) income is defined as the income earned from the use of the fishing gear including fishermen and vessel in non-fishing activities.

House rental was not taken into consideration in the calculation of the gross product since the building capital was not included in the capital structure of fishermen. Fishermen's income is the sum of the production value and non-fishing income.

### **d. Net receipts**

Net receipts of the fishermen from fishing activities were calculated by subtracting the total operating expenses from the gross product. The net receipts were calculated using the following equation:

$$N.R = G.R - O.P$$

Where,

N.R = Net receipts

G.R = Gross receipts

O.P = Operating expenses

(Erkuş et al 1995).

### **e. Gross profit**

Gross profit is calculated by subtracting the variable operating expenses from the net receipts. Other expense items than the variable operating expenses and the profit are included

in the gross profit. Gross profit is an important criterion in that it determines the competitive powers of production and reflects the success of the organisation of the enterprise. An enterprise has to have a greater total gross profit than the other expenses excluding the variable expenses to provide net income. Therefore, maximisation of gross profit is aimed in enterprises to provide income (Erkuş et al 1995).

#### **f) Agricultural income**

Agricultural income is the sum of the entrepreneur's equity capital surplus and the wages earned by the entrepreneur himself and his family members. The fishery income was calculated using the following formula (Erkuş et al 1995).

$$\text{Agricultural Income} = \text{Net Receipts} - (\text{Debt Interest} + \text{Rental}) + \text{Provision for Wage of Family Labour}$$

Provision for wage of family labour is the provision for the labour of the fisherman and the family members of the fisherman who work as crew members on board the vessel. Since licensing of persons is required to carry out a fishing activity and since the fishing activity is not a joint activity of the family members, the family of fisherman cannot accompany him during fishing. For this reason, unlike the general approach adopted for the analysis of agricultural enterprises, only the provisions for wages of labour of fisherman and family members of fisherman, if any, accompanying him during fishing were considered.

Agricultural income is important in that it reflects the real income of the entrepreneur and shows the spendable amount by the entrepreneur without any reduction in the capital equity. (Bülbül 1979).

Here, the term **fishery income** will be used instead of the term agricultural income to ensure consistency in the whole research process since the latter is used for the analysis of agricultural enterprises and is not included in the fishery terminology.

#### **g) Family income**

Family income covers the fishery income as well as non-fishing income of the family. Non-fishing income comprises the wage income of fisherman working in a second work and of the other members of the family who work with the fisherman, and the pensions, revenues from products, rental revenues and professional income.

#### **h) Profitability**

Profitability is ratio of the profit of an enterprise gained in a certain period of time to the working capital of that enterprise. The profitability is an important criterion in that it reflects the achievements of agricultural enterprises at the end of their activities and it is used for the purposes of the comparison of enterprises with each other. In the enterprises surveyed, the rates of financial and economic profitability were calculated using the formulas given below (Erkuş et al 1995):

$$\text{Economic Profitability} = \frac{\text{Net Receipts}}{\text{Active Capital}} \times 100$$



$$\text{Financial Profitability} = \frac{\text{Net Receipts} - (\text{Debt Interests} + \text{Leasing and Partnering Share})}{\text{Equity Capital}} \times 100$$

Evaluation of kinds of profitability is made by the comparison of the current normal interest limit in the relevant country with the profitability rates. Where the working capital of the enterprise produced a higher level of profitability than that of a normal interest limit that may be obtained from a bank or of the interest amount of a bond, the situation will be considered as good, however, otherwise, the entrepreneur's labour and efforts will be in vain (Erkuş et al 1995).

### **3.2.7. Statistical methods**

The methods of Düzgüneş et al (1983) and Yamane (2001) were employed to compare and control the technical and physical features of the fishing fleet, socio-economic characteristics of fishermen, and the parameters obtained from the financial and economic analysis of fishing activities. For the purposes of the comparisons and controls, the significance level was taken as P: 0.05.

## 4. RESEARCH RESULTS

### 4.1. Technical and Physical Features of the Fishing Fleet in the Black Sea Region

#### 4.1.1. Operational type of fishing vessels

The fishing vessels operating in the Black Sea Region were examined in two categories by type of operation (type of fishery): coastal fishing (small-scale fishery) and medium/large scale fishery.

The majority (82.14%) of the indicative fishing vessels operating in the Black Sea Region was found to have been coastal fishing vessels (small-scale fishery). The medium and large-scale fishing vessels (purse-seiner, trawler, trawler-purse seiner) account for 17.86% (purse-seiners 6.82%, trawlers 9.09%, trawler-purse seiners 1.95%) of the fishing vessels in terms of their numbers (Table 4.1).

**Table 4.1.** Breakdown of the indicative fishing vessels in the Black Sea Region by length and type categories

Length Categories (m)	Indicative fishing vessels	
	n	n%
<8	187	60.71
8-12	61	19.81
12-20	26	8.44
20-30	24	7.79
≥30	10	3.25
Type of fishery		
Small-Scale (Coastal fishing) Fishery Total		<b>253</b>
		<b>82.14</b>
Medium And Large Scale Fishery	Purse-seiner	21
	Trawler	28
	Trawler-Purse seiner	6
	Total	<b>55</b>
		<b>17.86</b>
<b>Overall total</b>		<b>308</b>
		<b>100.00</b>

The majority of the indicative coastal fishing vessels are less than 12 m in length and they operate in an area away from the shore, where they return and land their catches. In addition, those fishing vessels that are more than 12 m in length and on board of which the fishing gears like diver's equipment, lift nets, etc. are installed also hold a coastal fishing licence.

Although the purse-seiners, trawlers, and trawler-purse seiners are small in number and only account for 17.86% of the indicative vessels in the Black Sea Region, they have the highest proportion in capture fisheries both in the Black Sea and throughout Turkey.

#### 4.1.2. Length of fishing vessels

The indicative fishing vessels in the Black Sea Region were found to be 4-62 m in length (Table 4.2).

**Table 4.2.** Breakdown of the indicative fishing vessels in terms of length in the Black Sea Region by length and type categories (m)

Length (m)	Minimum	Maximum	Average	
<8	4.00	7.90	6.57	
8-12	8.20	11.90	9.32	
12-20	12.12	19.90	15.10	
20-30	20.40	27.50	24.80	
≥30	30.00	62.00	39.50	
Type of fishery				
Average of small-scale (Coastal fishing) fishery	4.00	17.45	7.39	
Medium and large scale fishery	Purse-seiner	12.12	62.00	27.89
	Trawler	12.12	27.50	20.58
	Trawler-Purse seiner	14.00	27.00	23.98
	Average	<b>12.12</b>	<b>62.00</b>	<b>23.74</b>
<b>Overall average</b>	<b>4.00</b>	<b>62.00</b>	<b>10.32</b>	

As it can be seen in the Table 4.2 above, while the coastal fishing vessels are 4.00 – 17.45 m in length (7.39 m in average), the medium and large-scale fishing vessels are 12.12 – 62.00 m in length (23.74 m in average).

Further, 2.40% of the coastal fishing vessels are more than 12 m in length and 97.60% are less than 12 m in length. All of the medium and large-scale fishing vessels consist of purse-seiners more than 30 m in length, with an average length of 39.50 m. They account for 3.24% of the fishing vessels operating in the Black Sea Region.

#### 4.1.3. Age of fishing vessels

The fishing vessels in the Black Sea Region were determined to have been at an age of 0-45 years, with an average age of 13.33 years (Table 4.3).

**Table 4.3.** Breakdown of the fishing vessels in terms of age by length and type categories (%)

Length Categories (m)	Minimum	Maximum	Average	
<8	-	40	13.51	
8-12	1	45	11.91	
12-20	1	41	16.53	
20-30	2	26	12.38	
≥30	3	26	12.00	
Type of fishery				
Average of small-scale (Coastal fishing) fishery	-	45	13.10	
Medium/ Large Scale Fishery	Purse-seiner	2	33	12.43
	Trawler	5	41	16.90
	Trawler-Purse seiner	1	22	9.50
	Average	<b>1</b>	<b>45</b>	<b>14.85</b>
<b>Overall average</b>	<b>-</b>	<b>45</b>	<b>13.33</b>	

While the fishing vessels that are 8-12 m in length are the youngest vessels with an average age of 11.91 years, those that are 12-20 m in length are the oldest with an average age of 16.53 years. The length category and the average age had no relation with each other ( $r=0.2086$ ).

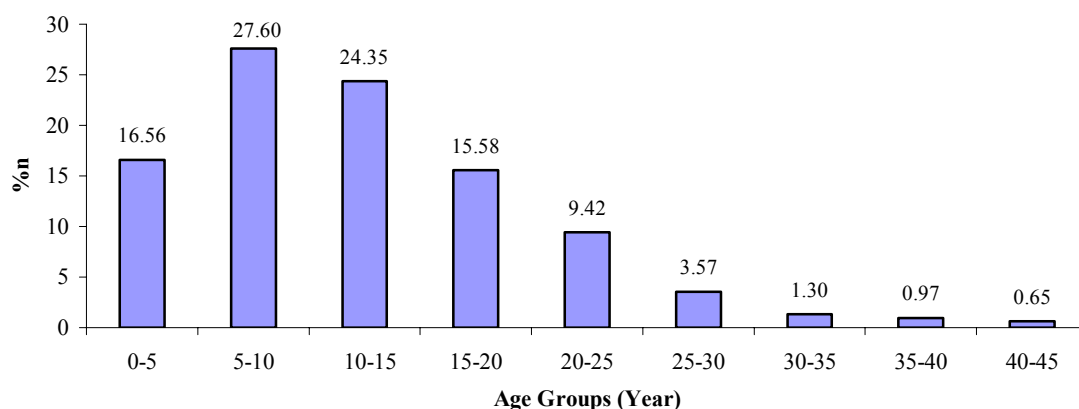
The coastal fishing vessels (13.10 years old) are 1.75 years in average younger than the medium and large-scale fishing vessels. Out of the fishing vessels that are used for medium and large-scale fishery, the trawler-purse seiners are the youngest with an average age of 9.50 years, and the trawlers are the oldest with an average age of 16.90 years. While among the fishing vessels that are less than 12 m in length, the oldest vessel was 45 years old, among those that are more than 12 m in length, the oldest one was 41 years. (Table 4.3)

Dividing of the fishing vessels in the Black Sea Region in age groups with intervals of 5 years revealed that 84.08%, 44.16%, and 16.56% are younger than 20, 10 and 5 years of age respectively. Most of the fishing vessels in the Black Sea Region are in the age group of 5-10 years. They are followed by the vessels that are in the age group of 10-15 and 0-5 years, respectively (Table 4.4).

**Table 4.4.** Breakdown of the fishing vessels of different age groups by length and type categories (%)

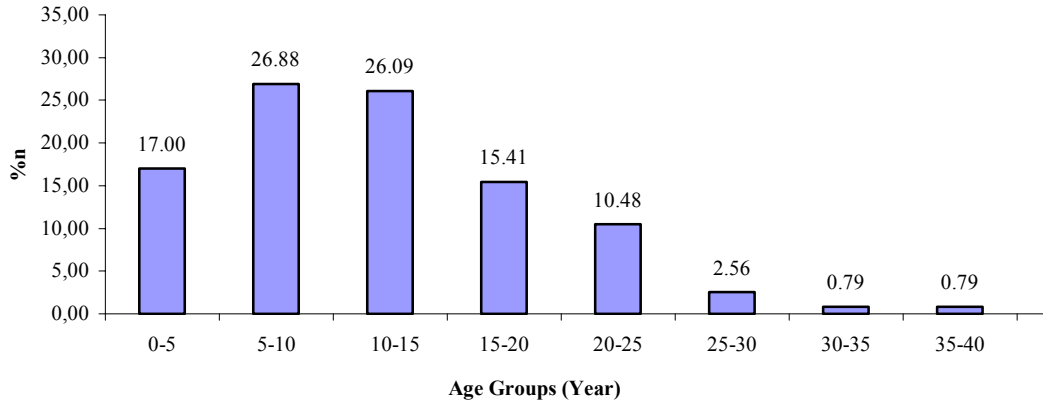
Length (m)	Age groups (Year)									Total
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	
<8	11.04	14.61	14.93	10.06	7.14	1.62	0.65	0.65	-	60.71
8-12	2.60	6.82	6.17	2.60	0.97	0.32	-	-	0.32	19.81
12-20	1.62	2.27	0.97	0.32	0.97	0.97	0.65	0.32	0.32	8.44
20-30	0.97	2.60	1.62	1.95	0.32	0.32	-	-	-	7.79
≥30	0.33	1.30	0.65	0.65	0.00	0.33	-	-	-	3.25
<b>Type of fishery</b>										
Small-scale (Coastal fishing) Fishery Total	<b>13.96</b>	<b>22.08</b>	<b>21.43</b>	<b>12.66</b>	<b>8.45</b>	<b>1.94</b>	<b>0.65</b>	<b>0.65</b>	<b>0.33</b>	<b>82.14</b>
Medium and large scale fishery	Purse-seiner	1.30	2.27	0.97	1.62	-	0.33	0.33	-	6.82
	Trawler	0.65	2.92	1.30	1.30	0.65	1.30	0.32	0.32	9.09
	Trawler-Purse seiner	0.65	0.33	0.65	-	0.32	-	-	-	1.95
	Total	<b>2.60</b>	<b>5.52</b>	<b>2.92</b>	<b>2.92</b>	<b>0.97</b>	<b>1.63</b>	<b>0.65</b>	<b>0.32</b>	<b>0.32</b>
<b>Overall total</b>	<b>16.56</b>	<b>27.60</b>	<b>24.35</b>	<b>15.58</b>	<b>9.42</b>	<b>3.57</b>	<b>1.30</b>	<b>0.97</b>	<b>0.65</b>	<b>100.00</b>

Most of the fishing vessels in the Black Sea Region are in the age groups of 5-10 and 10-15 years (Figure 4.1).



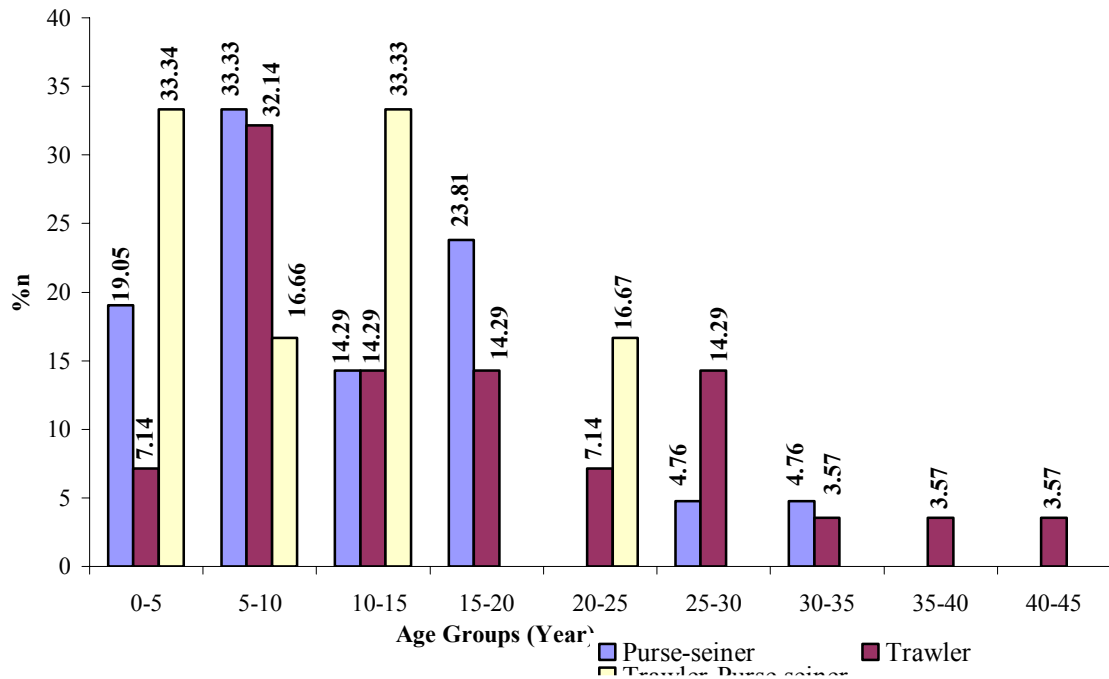
**Figure 4.1** Breakdown of the fishing vessels in the Black Sea Region by age groups (%)

43.88% of the coastal fishing vessels are younger than 10 years of age. Out of the fishing vessels in this group, more than half of them (69.97%) are younger than 15 years of age, and 31.03% of them are older than 15 years of age (Figure 4.2).



**Figure 4.2.** Breakdown of the coastal fishing vessels by age groups (%)

Out of the medium and large-scale fishing vessels, the trawler-purse seiners are the youngest vessels, and the trawlers are the oldest ones. More than half of the trawler-purse seiners are younger than 10 years of age. There are no trawlers-purse seiners at the age of 25 years of age and older. 67.86% of the purse-seiners are younger than 15 years of age (Figure 4.3).



**Figure 4.3.** Breakdown of the vessels used for medium and large-scale fishery by age groups (%)

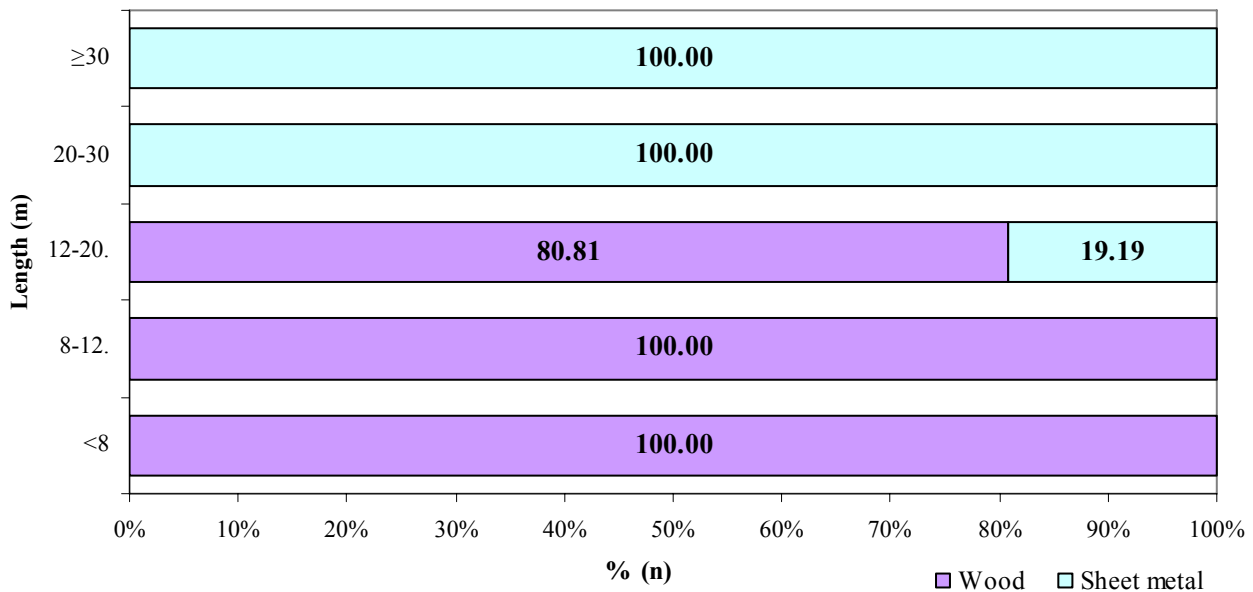
#### 4.1.4. Construction material of fishing vessels

87.34% and 12.66% of the fishing vessels in the Black Sea Region were found out to have been constructed of wood and sheet metal, respectively (Table 4.5).

**Table 4.5.** Breakdown of the construction materials of fishing vessels by length and type categories (%)

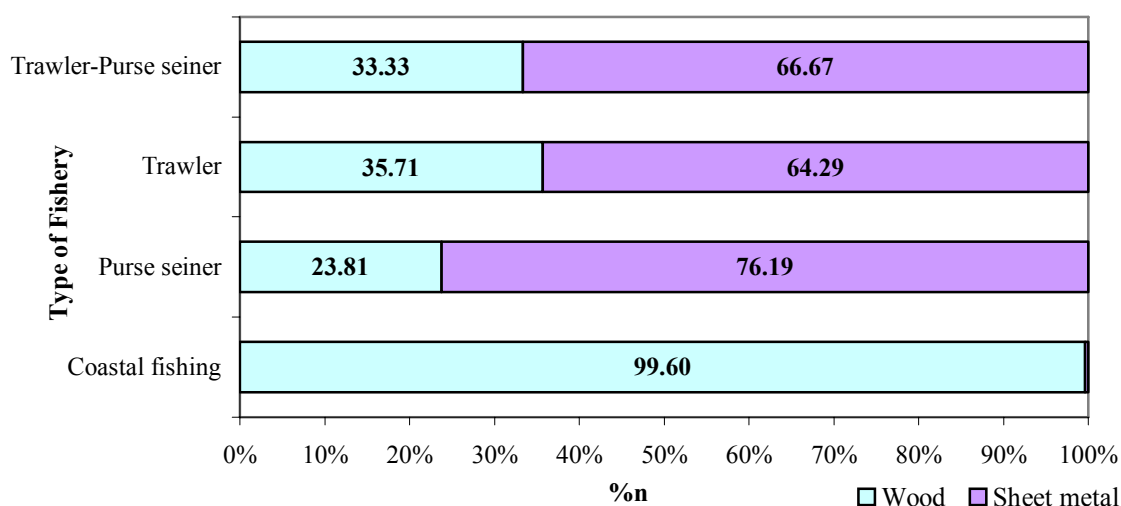
Length (m)	Construction material		Total	
	Wood	Sheet metal		
<8	60.71	-	60.71	
8-12	19.81	-	19.81	
12-20	6.82	1.62	8.44	
20-30	-	7.79	7.79	
≥30	-	3.25	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>81.82</b>	<b>0.32</b>	<b>82.14</b>
Medium/ Large Scale Fishery	Purse-seiner	1.62	5.20	6.82
	Trawler	3.25	5.84	9.09
	Trawler-Purse seiner	0.65	1.30	1.95
	Total	<b>5.52</b>	<b>12.34</b>	<b>17.86</b>
<b>Overall total</b>		<b>87.34</b>	<b>12.66</b>	<b>100.00</b>

As it is depicted in Figure 4.4 below, all of the fishing vessels that are less than 12 m in length are constructed of wood and all of those that are more than 20 m in length are of sheet metal. Further, 80.81% and 19.19% of the vessels that are 12-20 m in length are constructed of wood and sheet metal, respectively (Figure 4.4). Out of those vessels, majority of the wood vessels were determined to have been older than 20 years of age and small purse-seiners operating with conventional methods.



**Figure 4.4.** Breakdown of the construction materials of fishing vessels by length category (%)

All of the coastal fishing vessels except one (99.60%) are constructed of wood. Most of the medium and large-scale fishing vessels (69.05%) are, on the other hand, constructed of sheet metal. While the highest number of wood vessels (35.71%) is present among trawlers, the minimum number of wood vessels (23.81%) is present among purse-seiners. 1/3 of the trawler-purse seiners are constructed of wood and 2/3 of sheet metal (Figure 4.5).



**Figure 4.5.** Breakdown of the fishing vessels of wood and sheet metal by type of fishery (%)

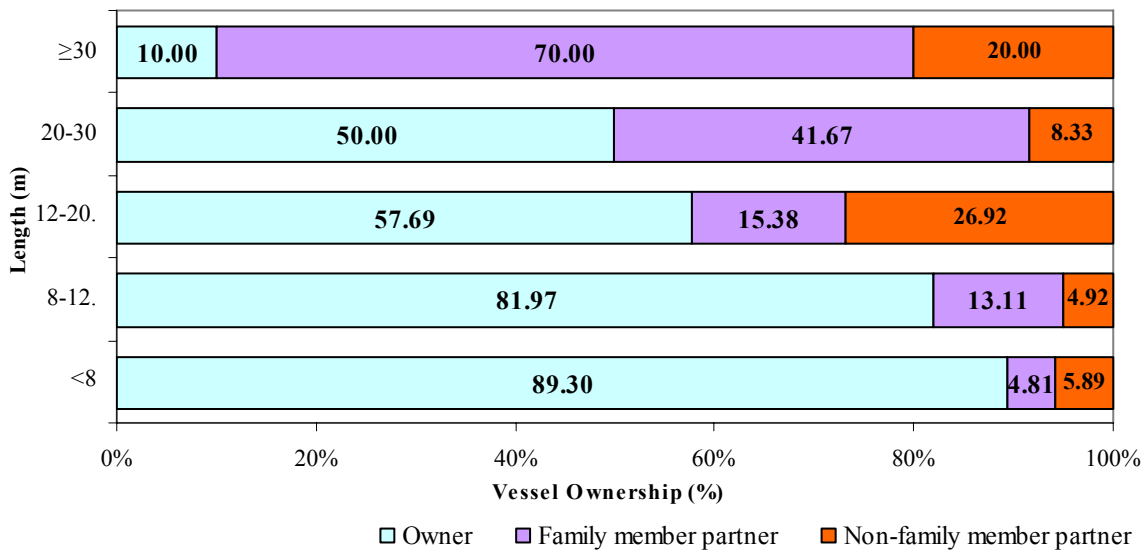
#### 4.1.5. Ownership of fishing vessels

It was found that while 79.54% of the fishermen in the Black Sea Region had their own vessels, 20.46% of them had a joint ownership. 60.31% of the joint owners consist of family members (Table 4.6).

**Table 4.6.** Breakdown of the ownership of main boats by length and type categories (%)

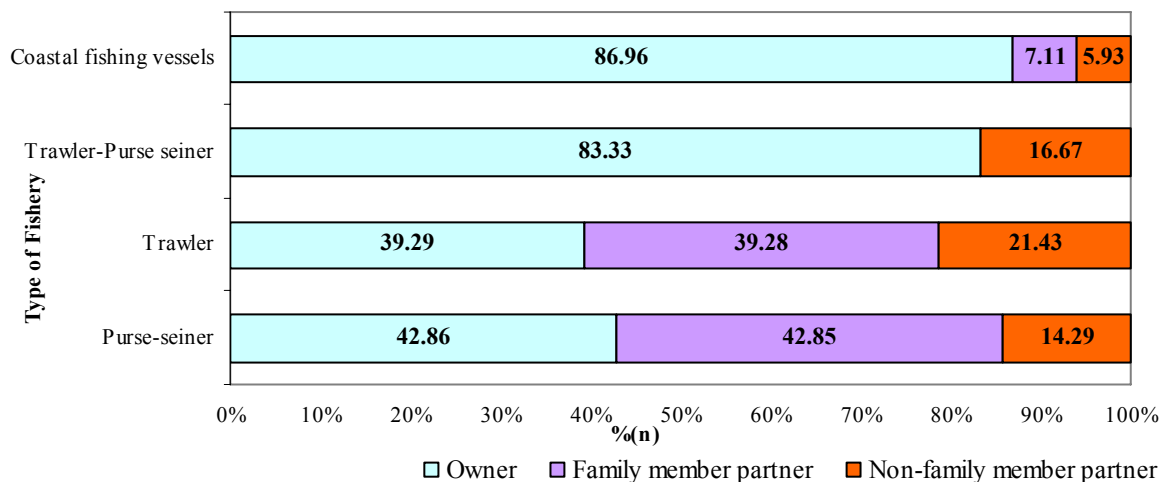
Length (m)	Vessel ownership			Total	
	Owner	Partner			
		Family member	Non-family member		
<8	54.22	2.92	3.57	60.71	
8-12	16.23	2.60	0.98	19.81	
12-20	4.87	1.30	2.27	8.44	
20-30	3.89	3.25	0.65	7.79	
≥30	0.33	2.27	0.65	3.25	
Type of fishery					
Small-scale (Coastal fishing) Fishery Total		71.43	5.84	4.87	82.14
Medium and Large Scale Fishery	Purse-seiner	2.92	2.93	0.97	6.82
	Trawler	3.57	3.57	1.95	9.09
	Trawler-Purse seiner	1.62	-	0.33	1.95
	Total	8.11	6.5	3.25	17.86
<b>Overall total</b>		<b>79.54</b>	<b>12.34</b>	<b>8.12</b>	<b>100.00</b>

As the vessels grew in length, the joint ownership increased. While most of the vessels in the first length category (89.30%) are owned by one person, 90.00% of those vessels that are more than 30 m in length are under a joint ownership (Figure 4.6). As the vessels grew in length, the family members were preferred as partners at a higher rate. While the rate of the family members in the joint ownership is 4.81% for the vessels less than 8 m in length, it rises to 70% for the vessels more than 30 m in length.



**Figure 4.6.** Breakdown of the ownership status of main boats by length category (%)

86.96% of the coastal fishing vessels, 42.86% purse-seiners (10% of those more than 30 m in length), 39.29% of trawlers, and 83.33% trawler-purse seiners are owned by fishermen. As the vessel grow in length, the capital of vessel and fishing gear increase. Higher number of purse-seiners and trawlers are under joint ownership when compared to the coastal fishing vessels and the partners generally consist of family members (Figure 4.7).



**Figure 4.7.** Breakdown of the ownership status of main boats by type of fishery (%)



It was determined that 98.71% of the fishermen in the Black Sea Region carried out their fishing activities with only one fishing vessel and that 1.29% of them with two or more vessels (Table 4.7).

**Table 4.7.** Rate of the owners of the accompanying boats and carrier boats by length and type categories (%)

Length (m)	Accompanying boat		Carrier boat		
	Owner	Lease holder	Owner	Lease holder	
<8	0.32	-	0.65	-	
8-12	0.32	-	-	-	
12-20	-	-	0.32	-	
20-30	-	0.32	0.98	0.32	
≥30	0.33	-	2.92	0.65 (+0.32)	
Type of fishery					
Small-scale (Coastal fishing) Fishery Total		<b>0.65</b>	-	<b>0.65</b>	-
Medium/ large scale fishery	Purse-seiner	0.32	0.32	4.22	0.97 (+0.32)
	Trawler	-	-	-	-
	Trawler-Purse seiner	-	-	-	-
	Total	<b>0.32</b>	<b>0.32</b>	<b>4.22</b>	<b>0.97 (+0.32)</b>
<b>Overall total</b>		<b>0.97</b>	<b>0.32</b>	<b>4.87</b>	<b>0.97 (+0.32)</b>

As indicated in Table 4.7 above, 0.97% and 4.87% of the fishermen own accompanying boats and carrier boats, respectively. On the other hand, 0.32% and 0.97% of the fishermen hired their accompanying boats and carrier boats, respectively. 0.32% of the fishermen hired a carrier boat in addition to their own carrier boats.

Although it was known that some of the purse-seiners operating in the Black Sea Region (in particular, those operated by brothers) carry out fishing activities together with more than one main boats, this was not reflected in the surveys. This was the result of the fact that those vessels were not registered with a legal entity, but rather each registered under the name of brothers, separately.

Regarding the length category, only the fishermen who are owners of the vessels that are 12-20 m in length carry out fishing activities with single boat. Fishermen operating vessels that are 20-30 m or over in length begin to use a carrier boat to land their catches. While 12.50% of the fishermen from the length category of 20-30 m own carrier boats, 90% of those from the length category of ≥30 own carrier boats. Out of the fishermen from the two length categories mentioned above, 4.17% and 30% respectively hired carrier boats. ≥20% of the fishermen from the length category of 30 m hired a carrier boat in addition to their own carrier boats. (Additional Table 4).

0.65% of the coastal fishermen own an accompanying boat and a carrier boat. Among the coastal fishermen, those who own carrier boats primarily operate as the masters of carrier boats, and when those boats are not used, they carry out coastal fishing. The vessel owners reported that they earned much income from the lease of their carrier boats, together with master's share, than that from coastal fishing.

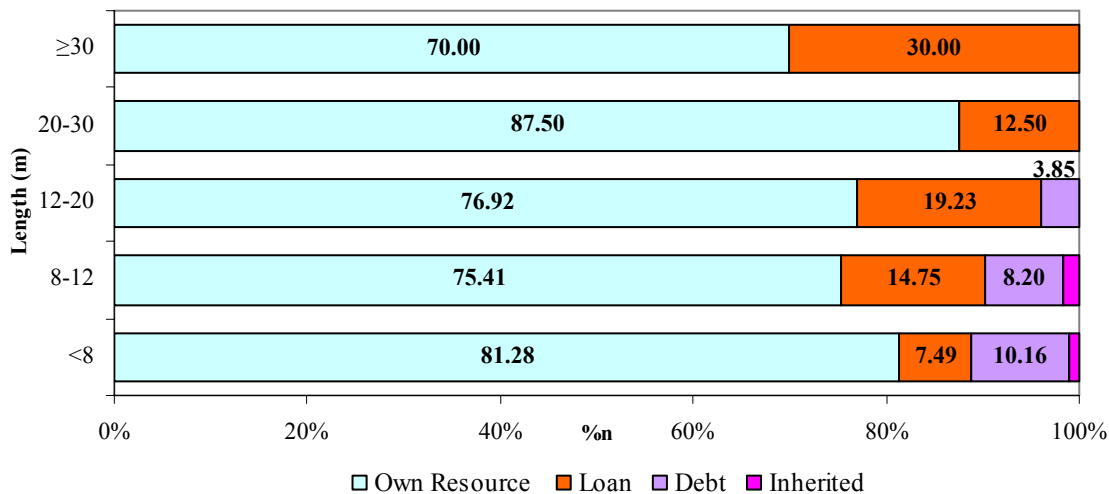
#### 4.1.6. Purchase of fishing vessels

It was found out that out of the fishermen operating in the Black Sea, who own their fishing vessels, 79.87% purchased their vessels by means of their own resources, 11.04% purchased using loans, 8.12% purchased by debt, and 0.97% inherited their vessels (Table 4.8).

**Table 4.8.** Breakdown of the type of purchase of fishing vessels by length and type categories (%)

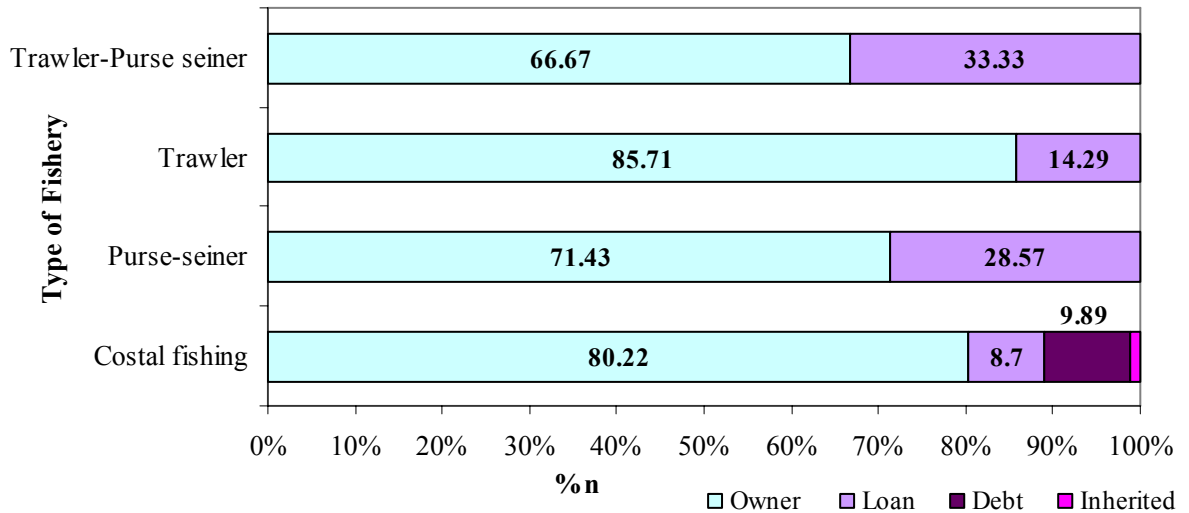
Length (m)	Type of purchase				Total	
	Own resource	Loan	Debt	Inherited		
<8	49.35	4.54	6.17	0.65	60.71	
8-12	14.94	2.92	1.63	0.32	19.81	
12-20	6.49	1.63	0.32	-	8.44	
20-30	6.82	0.97	-	-	7.79	
≥30	2.27	0.98	-	-	3.25	
Type of fishery						
Small-scale (Coastal fishing) Fishery Total		<b>65.59</b>	<b>7.46</b>	<b>8.12</b>	<b>0.97</b>	<b>82.14</b>
Medium and Large Scale Fishery	Purse-seiner	4.87	1.95	-	-	6.82
	Trawler	7.79	1.30	-	-	9.09
	Trawler-Purse seiner	1.62	0.33	-	-	1.95
	Total	<b>14.28</b>	<b>3.58</b>	-	-	<b>17.86</b>
<b>Overall total</b>		<b>79.87</b>	<b>11.04</b>	<b>8.12</b>	<b>0.97</b>	<b>100.00</b>

As it is indicated in Table 4.8 above, the rate of the fishermen who purchased their vessels by debt from the minimum length category to the length category of 20-30 m exhibited a downward trend. Beginning from the length category 20-30 m, there are no fishermen who have purchased their vessels by debt. As the vessels grow in length, the rate of the fishermen who have purchased their vessels using loans increases ( $r=0.7949$ ). While the rate of use of loan was 7.49% for the purchase of the vessels less than 8 m in length, it rose to 30% in the length category of  $\geq 30$  (Figure 4.8).



**Figure 4.8.** Breakdown of the type of purchase of fishing vessels by length category (%)

Regarding the type of fishery, while the highest rate of loan use was observed among the purse-seiner owners (28.57%), the minimum rate was observed among the vessels owners engaged in coastal fishing (8.70%). Only the coastal fishermen purchased their vessels by debt. Among those fishermen, 9.89% purchased their vessels by debt. Among the medium and large-scale fishermen, none of them purchased their vessels by debt (Figure 4.9).



**Figure 4.9.** Breakdown of the type of purchase of fishing vessels by type of fishery (%)

#### 4.1.7. Fishing nets and other fishing gear on board the fishing vessels

Fishing nets appear to be most important fishing gear. Although different kinds of fishing rods (longline, set longline and other kinds of fishing rods), and dredges, lift nets and diver's equipment were observed on board the vessels, the fishing nets appeared to have been a common tool in commercial fishing. On the other hand, lift nets, dredges and diver's equipment are used by the coastal fishermen who fish for only certain fish species that require the use of only those fishing gears. It was observed, as in the fishing nets, that some of those fishing gears (e.g., the lift nets and diver's equipment for fishing sea snail) were used intensively. It was determined that although the fishing nets were equipped, used and marked in different ways, the fishermen used similar fishing nets.

Based on the observation that all the coastal fishing vessels had fishing rods, they appeared to have been more commonly used by the coastal fishermen when compared to fishing nets. It was found out that the coastal fishing vessels had 24 fishing gears, mainly fishing nets, other than fishing rods. However, majority of those fishing gears are installed on board only some of the vessels. The coastal fishing vessels generally have bonito entangling net (63.64%), whiting entangling net (51.48%), grey mullet (Russia) entangling net (50.99%), and striped mullet entangling net (33.99%) (Table 4.9).

It was observed that the coastal fishing vessels usually had a combination of whiting-bonito entangling nets and grey mullet (Russia) entangling net or whiting-bonito-striped mullet entangling nets and grey mullet (Russia) entangling net, and that the vessels that were intensively used for commercial fishing and provided higher volumes of landings had diversified and greater number of entangling nets.

**Table 4.9.** Fishing gear installed on board the coastal fishing vessels (%)

<b>Fishing gear*</b>	<b>n%</b>	<b>Fishing gear</b>	<b>n%</b>
Striped mullet entangling net	33.99	Cast net	1.98
Bluefish entangling net	2.77	Lift net	13.44
Black scorpion fish entangling net	3.56	Diver's equipment	5.53
Horse mackerel entangling net	12.25	Bottom trawl	2.77
Turbot entangling net	20.16	Dredge	0.79
Bluefish entangling net	4.35	Bonito purse-seine	0.40
Whiting entangling net	51.48	Beach seine net	0.40
Bonito entangling net	63.64	Beach seine net	0.79
Short-body sardinella entangling net	12.65	Mid-water trawl	0.40
Grey mullet (Turkey) entangling net	5.14	Cast net	9.49
Gav fish entangling net	13.83	Horse mackerel cast net	2.77
Spear	0.40	Grey mullet (Russia) cast net	50.99

(\*) : Fishing rods are not included.

Regarding the medium and large-scale fishery, while the anchovy purse-seiners account for the highest number of nets on board the purse-seiner vessels (80,95%), the bottom trawlers account for the highest number of nets on board the trawler-purse seiner vessels (103.57%) (Table 4.10).

**Table 4.10.** Fishing gear installed on board the purse-seiners, trawlers and trawler-purse seiners (%)

<b>Fishing gear*</b>	<b>Purse-seiner</b>	<b>Trawler</b>	<b>Trawler-Purse seiner</b>
Anchovy purse-seine	80.95	-	-
Horse mackerel purse-seine	57.14	-	33.33
Tuna purse-seine	14.29	-	-
Bonito purse-seiner	42.86	-	83.33
Grey mullet (Turkey) purse-seiner	9.52	-	-
Beach seine net	4.76	-	-
Entangling nets	47.62	67.85	66.67+66.67
Lift net	-	17.86	50.00
Diver's equipment	-	7.14	-
Bottom trawl	-	96.43+7.14	100.00
Dredge	-	3.57	-
Mid-water trawl	-	57.14	16.67

(\*) : Fishing rods are not included.

It was observed that as the purse-seiners grew in length, the fishing gears became simpler, the weight was put on the combination of anchovy-horse mackerel or anchovy-bonito purse-seiners, and that for the vessels more than 40 m in length the tuna purse-seiners were on the ground. The entangling nets and grey mullet (Turkey) purse-seiner were found out to have been used by only the purse-seiner vessels less than 25 m in length.

The main fishing gear was bottom trawl, which is installed on board every vessel, for the trawlers and trawler-purse seiners. On the other hand, the combinations of bottom trawl-entangling net and bottom trawl - mid-water trawl were highest on board the trawler vessels. It was determined that as the trawler vessels grow in length, the combinations of fishing gear become simpler and the combination of bottom trawl – mid-water trawl – bonito entangling net is begun to be preferred.

For the trawler-purse seiners, mid-water trawls have been replaced by bonito purse-seines and bonito entangling nets, as well as lift nets. On board those vessels, the combination of bottom trawl – bonito entangling net – bonito purse-seine was highest. In addition, the lift nets were seen on board the trawler-purse seiners that are less than 20 m in length.

#### **4.1.8. Electrical devices and equipment on board the fishing vessels**

The fishing vessels operating in the Black Sea Region have a number of various electrical devices and equipment from radios to current meters (Table 4.11).

**Table 4.11.** Breakdown of the electrical devices and equipment installed on board the fishing vessels by length and type categories (%)

Electrical devices	Length (m)					Overall average
	<8	8–12	12-20	20–30	≥30	
Radio	16.58	57.38	84.62	100.00	100.00	<b>39.61</b>
Telephone	0.53	-	19.23	50.00	60.00	<b>7.79</b>
SSB Radio	-	-	-	4.17	60.00	<b>2.27</b>
Sonar	-	-	3.85	25.00	100.00	<b>5.52</b>
Radar	-	1.64	92.31	100.00	100.00	<b>19.16</b>
Generator	0.53	1.64	11.54	83.33	100.00	<b>11.36</b>
Depth finder	4.81	26.23	3.85	-	-	<b>8.44</b>
GPS-Satellite	0.53	1.64	34.62	91.67	90.00	<b>13.64</b>
Fishpomp	-	-	-	41.67	100.00	<b>6.49</b>
Fax	-	-	3.85	-	20.00	<b>0.97</b>
Eco-sounder	2.67	19.67	57.69	100.00	100.00	<b>21.43</b>
Ice machine	-	-	-	4.17	20.00	<b>0.97</b>
Auto pilot	-	-	-	-	20.00	<b>0.65</b>
Current meter	-	-	-	4.17	80.00	<b>2.92</b>
Electrical devices	Type of fishery					Overall average
	Coastal fishing	Medium and large-scale fishery				
		Purse-seiner	Trawler	Trawler-Purse seiner	Average	
Radio	26.88	95.24	100.00	100.00	<b>98.18</b>	<b>39.61</b>
Telephone	1.58	33.33	39.29	33.33	<b>36.36</b>	<b>7.79</b>
SSB Radio	-	28.57	3.57	-	<b>12.73</b>	<b>2.27</b>
Sonar	-	66.67	-	50.50	<b>30.91</b>	<b>5.52</b>
Radar	2.37	100.00	92.86	100.00	<b>96.36</b>	<b>19.16</b>
Generator	1.19	76.19	46.43	50.00	<b>58.18</b>	<b>11.36</b>
Depth finder	9.88	-	3.57	-	<b>1.82</b>	<b>8.44</b>
GPS-Satellite	1.98	71.43	64.29	66.67	<b>67.27</b>	<b>13.64</b>
Fishpomp	-	61.90	17.86	33.33	<b>36.36</b>	<b>6.49</b>
Fax	-	14.29	-	-	<b>5.45</b>	<b>0.97</b>
Eco-sounder	8.30	80.95	85.71	66.67	<b>81.82</b>	<b>21.43</b>
Ice machine	-	14.29	-	-	<b>5.45</b>	<b>0.97</b>
Auto pilot	-	9.52	-	-	<b>3.64</b>	<b>0.65</b>
Current meter	-	42.86	-	-	<b>16.36</b>	<b>2.92</b>

There was no electrical device other than dept finder and sonar on board the coastal fishing vessels. The purse-seiners have the highest number of electrical devices. Included in the equipment on board the purse-seiners are sonar and eco-sounder, which are fish finder devices, fishpomp, which is used for transshipment of the catch to the carrier boat, and ice machine, which produces ice to keep the catch fresh

#### 4.1.9. Engine power of fishing vessels

It was determined that the fishing vessels operating in the Black Sea Region had an engine power of 6-1670 HP. The coastal fishing vessels have the lowest engine power (39.83 HP). However, the purse-seiners have the highest engine power (477.86 HP). Further, the purse-seiners that are more than 30 m in length have an average engine power of 647.14 HP), which is the highest of all (Table 4.12).

**Table 4.12.** Engine power of fishing vessels by length and type categories (HP)

Length (m)	Engine Power			
	Minimum	Maximum	Average	
<8	6	135	23.24	
8-12	8	220	76.89	
12-20	31	420	177.57	
20-30	250	892	422.88	
≥30	400	1.670	647.14	
Type of fishery				
Average of small-scale (Coastal fishing) fishery		6	240	39.83
Medium and large scale fishery	Purse-seiner	135	1.670	477.86
	Trawler	130	600	308.80
	Trawler-Purse seiner	135	892	403.22
	Average	6	1,670	1,040.40
<b>Overall average</b>		<b>6</b>	<b>1,670</b>	<b>115.21</b>

While purse-seiners have in average 1.33 engines, trawlers have 1.25, trawler-purse seiners have 1.5, and the coastal fishing vessels traditionally have single engine.

## 4.2. Socio-economic Characteristics of the Fishermen in the Black Sea Region

### 4.2.1. Age and civil status of fishermen

The fishermen in the Black Sea Region are 25-70 years old, of which 85.06% are married and 14.96% are single (Table 4.13).

As it is indicated in Table 4.13, the oldest fishermen in average by length category appear to be the owners of the fishing vessels that are less than 8 m in length. The reason of this is that the majority of fishermen consist of the retired persons. The differences between the ages of fishermen by length category were found out not to have been meaningful ( $p>0.05$ ). Based on the type of fishery, while the owners of the trawler-purse seiners appear to be the oldest fishermen, the trawler owners appear to be the youngest ones.

**Table 4.13.** Age and civil status of fishing vessel owners by length and type categories

Length (m)	Age (Year)			Civil status (%)		
	Min.	Max.	Average	Married	Single	
<8	27	78	47.43	50.97	9.74	
8-12	23	68	44.44	16.56	3.25	
12-20	28	65	45.15	7.79	0.65	
20-30	25	70	45.46	7.14	0.65	
≥30	37	56	46.20	2.60	0.65	
<b>Type of fishery</b>						
Average of small-scale (Coastal fishing) fishery						
	23	78	46.69	69.15	12.99	
Medium and large-scale fishery	Purse-seiner	37	65	47.29	5.84	0.98
	Trawler	25	57	41.82	8.12	0.97
	Trawler-Purse seiner	32	70	55.00	1.95	-
	Average	<b>25</b>	<b>70</b>	<b>45.34</b>	<b>15.91</b>	<b>1.95</b>
<b>Overall average</b>						
	<b>23</b>	<b>78</b>	<b>46.45</b>	<b>85.06</b>	<b>14.94</b>	

#### 4.2.2. Educational level of fishermen

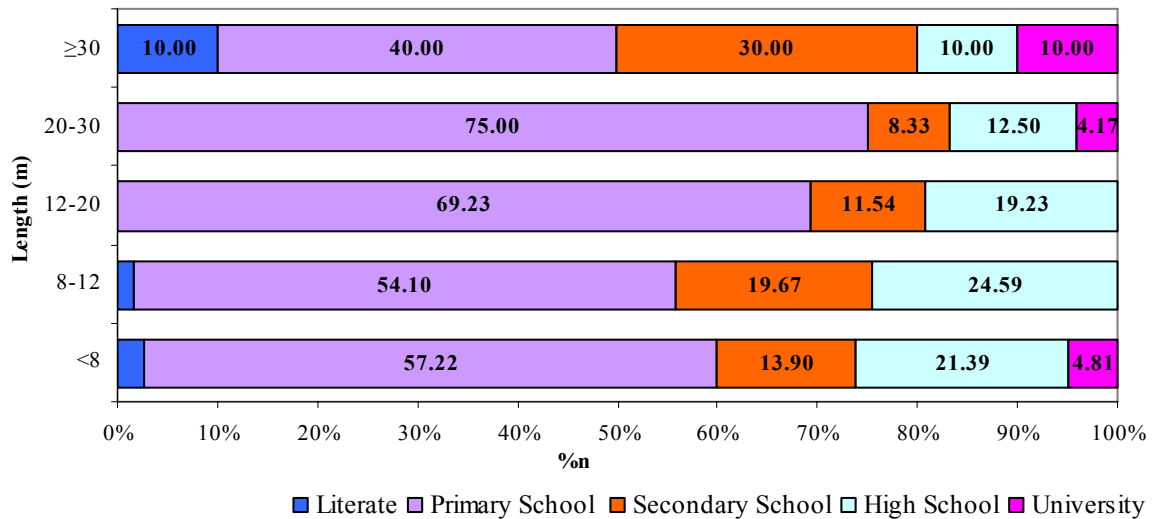
Educational levels of the fishermen in the Black Sea Region were determined to have been as follows: literate 2.27%; primary education 58.44%; secondary education 14.94%; high school 20.78%; university degree 3.57% (Table 4.14).

**Table 4.14.** Educational level of fishermen by length and type categories (%)

Length (m)	Educational level					
	Literate	Primary education	Secondary education	High school	University degree	
<8	1.62	4.74	8.44	12.99	2.92	
8-12	0.32	10.72	3.90	4.87	-	
12-20	-	5.84	0.98	1.62	-	
20-30	-	5.84	0.65	0.98	0.32	
≥30	0.33	1.30	0.97	0.32	0.33	
<b>Type of fishery</b>						
Small-scale (Coastal fishing) Fishery Total						
	<b>1.95</b>	<b>47.08</b>	<b>12.66</b>	<b>17.86</b>	<b>2.59</b>	
Medium and large-scale fishery	Purse-seiner	-	3.57	1.63	0.97	0.65
	Trawler	0.32	6.17	0.65	1.95	-
	Trawler-Purse seiner	-	1.62	-	-	0.33
	Total	<b>0.32</b>	1.36	2.28	<b>2.92</b>	<b>0.38</b>
<b>Overall total</b>						
	<b>2.27</b>	<b>58.44</b>	<b>14.94</b>	<b>20.78</b>	<b>3.57</b>	

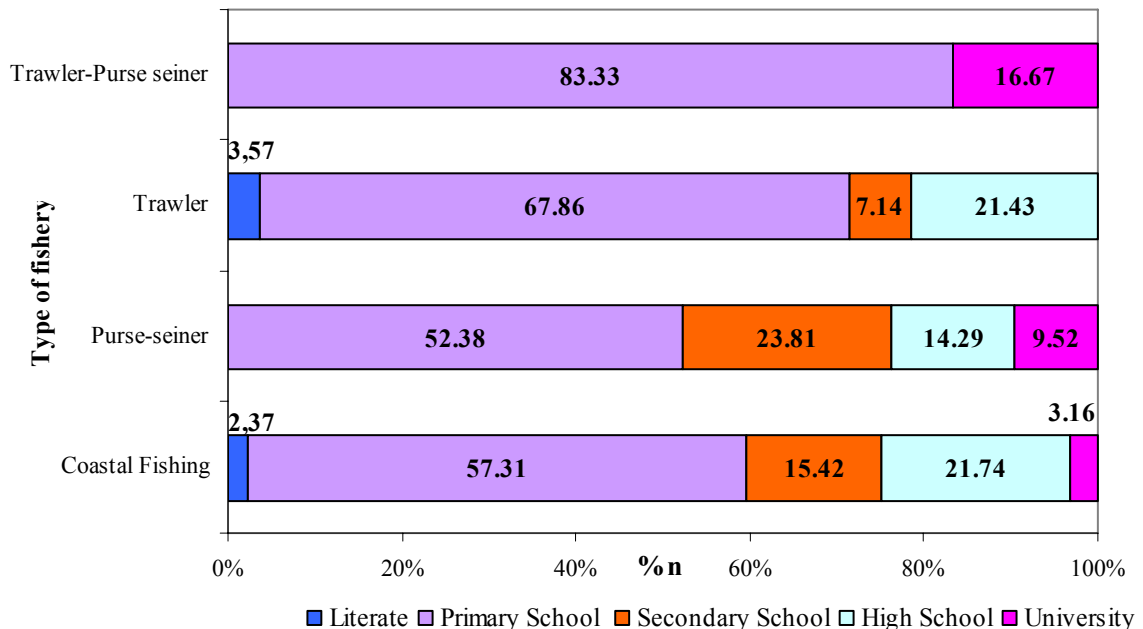
Regarding the length category, while the rate of the fishermen who had completed only their primary education was the highest in all the length categories (57.22%, 54.10%, 69.23%, 75.00% and 40.00% respectively by length category), the rate of the literate fishermen was the lowest (2.68%, 1.64%, 0.00%, 0.00% and 10.00% respectively by length category) (Figure 4.10).





**Figure 4.10.** Educational level of fishing vessel owners by length category (%)

Among the owners of the coastal fishing vessels, the fishermen who have completed only their primary education constitute the highest (57.31%); they also have the minimum level of education – i.e., literate (2.37%). Among the medium and large-scale fishermen, the owners of purse-seiner and trawler-purse seiner have the highest rate in terms of holding a university degree (9.52% and 16.67% respectively). The trawler owners are the only ones among whom there is no fisherman who holds a university degree. On the other hand, the owners of trawler-purse seiner are the only ones among whom there is no graduate of secondary school or high school. They are either graduates of primary school or hold a university degree (Figure 4.11).



**Figure 4.11.** Educational level of fishing vessel owners by type of fishery (%)

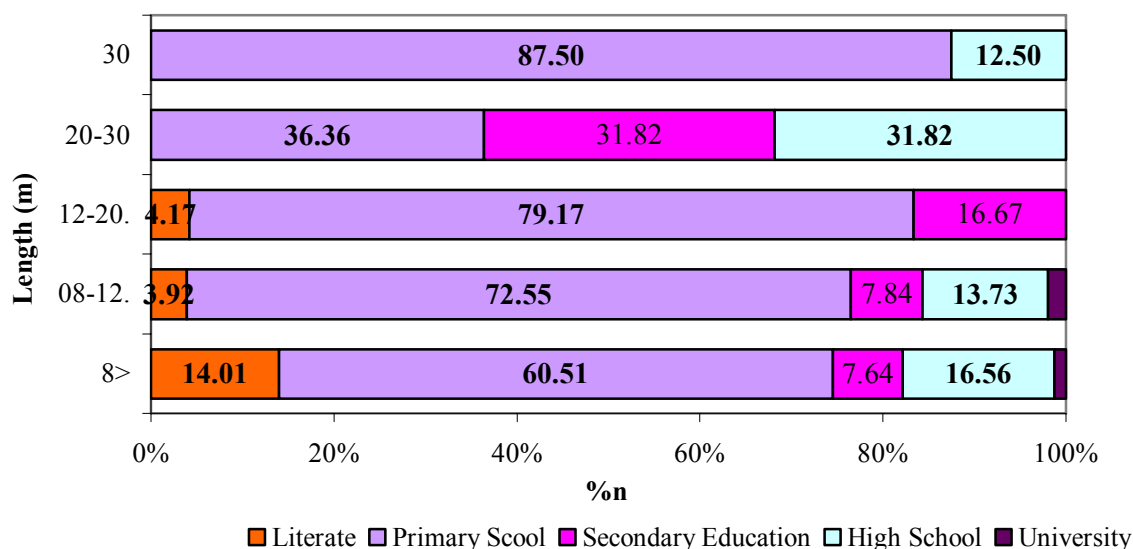
Further, educational levels of the spouses of fishermen in the Black Sea Region were determined to have been as follows: literate 7.79%; primary education 55.19%; secondary education 8.12%; high school 12.99%; university degree 0.97% (Table 4.15).

**Table 4.15.** Educational level of spouses of fishermen by length and type categories (%)

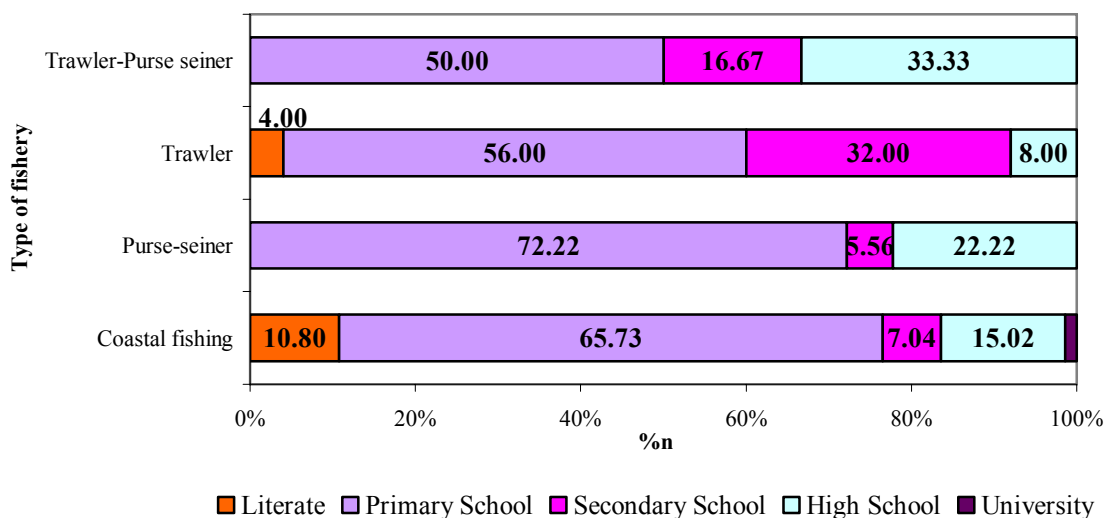
Length (m)	Educational level					Total	
	Literate	Primary education	Secondary education	High school	University Degree		
<8	7.14	30.84	3.90	8.44	0.65	50.97	
8-12	0.65	12.01	1.30	2.27	0.32	16.56	
12-20	0.32	6.17	1.30	0.00	0.00	7.79	
20-30	0.00	2.60	2.27	2.27	0.00	7.14	
≥30	0.00	2.27	0.00	0.32	0.00	2.60	
<b>Type of fishery</b>							
Small-scale (Coastal fishing) Fishery Total		<b>7.47</b>	<b>45.45</b>	<b>4.87</b>	<b>10.39</b>	<b>0.97</b>	69.16
Medium and large-scale fishery	Purse-seiner	0.00	4.22	0.32	1.30	0.00	5.84
	Trawler	0.32	4.55	2.60	0.65	0.00	8.12
	Trawler-Purse seiner	0.00	0.97	0.32	0.65	0.00	1.95
	Total	<b>0.32</b>	<b>9.74</b>	<b>3.25</b>	<b>2.60</b>	<b>0.00</b>	<b>15.91</b>
<b>Overall total</b>		<b>7.79</b>	<b>55.19</b>	<b>8.12</b>	<b>12.99</b>	<b>0.97</b>	<b>85.06</b>

Regarding the length category, the spouses of fishermen who hold a university degree are present in the categories including the vessels that are less than 8 m in length (1.28) and are 8-12 m in length (1.96). In the length categories of 12-20 m and ≥30 m, the spouses are not at a higher level than secondary education (Figure 4.12).

Regarding the type of fishery, the only group of spouses who hold a university degree consists of the spouses of the coastal fishermen. As for the fishermen operating purse-seiners and trawler-purse seiners, there are illiterate ones among their spouses, and the majority of their spouses have completed just their primary education. 2/3 of the spouses of those fishermen have completed just their primary education, and 1/6 secondary education or graduates of high school (Figure 4.13).



**Figure 4.12.** Educational level of spouses of fishermen by length category (%)



**Figure 4.13.** Educational level of spouses of fishermen by type of fishery (%)

#### 4.2.3. Number of children of fishermen

The fishermen in the Black Sea Region have 2.20 children in average. While there are 1.25 boys in average per fisherman, the number of girls per fisherman is 0.95 (Table 4.16).

78.63% of the children of fishermen are single. While it is common for the single children to live with their families, it is common for the married to live in their own houses. The number of children who live with their families is 1.73, and the number of the married children is 0.47. Further, the number of the other members of the family who live with the fisherman is 0.10, majority of whom consist of the parents of fisherman. (Table 4.16)

**Table 4.16.** Average number of children of fishermen by length and type categories (Amount)

Length (m)	Single		Married		Total	Other*	
	Boy	Girl	Boy	Girl			
<8	1.01	0.63	0.24	0.35	2.23	0.17	
8-12	1.05	0.79	0.15	0.11	2.10	-	
12-20	1.12	0.54	0.15	0.19	2.00	-	
20-30	1.17	1.13	0.21	0.13	2.63	-	
≥30	1.00	0.70	0.20	-	1.90	-	
Type of fishery							
Average of small-scale (Coastal fishing) fishery		1.01	0.66	0.21	0.28	2.16	0.12
Medium and large-scale fishery	Purse-seiner	1.24	0.67	0.29	0.10	2.29	0.10
	Trawler	1.11	1.07	0.07	0.21	2.46	-
	Trawler-Purse seiner	1.00	0.33	0.83	0.33	2.50	-
	Average	<b>1.15</b>	<b>0.84</b>	<b>0.24</b>	<b>0.18</b>	<b>2.40</b>	<b>0.04</b>
<b>Overall average</b>		<b>1.04</b>	<b>0.69</b>	<b>0.21</b>	<b>0.26</b>	<b>2.20</b>	<b>0.10</b>

(\*) : Those other than spouse and children, who live with the fisherman.

#### 4.2.4 Household population of fishermen

The average household population of the fishermen in the Black Sea Region was determined to have consisted of 3.50-4.22 persons by length category and 3.33-4.07 persons by type of fishery, with an average number of 3.68 persons (Table 4.17).

**Table 4.17.** Average household population of fishermen by length and type categories (Person)

Length (m)	Single		Spouse	Other	Total*	
	Boy	Girl				
<8	1.01	0.63	0.84	0.17	3.65	
8-12	1.05	0.79	0.84	-	3.68	
12-20	1.12	0.54	0.92	-	3.58	
20-30	1.17	1.13	0.92	-	4.22	
≥30	1.00	0.70	0.80	-	3.50	
Type of fishery						
Average of small-scale (Coastal fishing) fishery		1.01	0.66	0.84	0.12	3.63
Medium and large-scale fishery	Purse-seiner	1.24	0.67	0.86	0.10	3.87
	Trawler	1.11	1.07	0.89	-	4.07
	Trawler-Purse seiner	1.00	0.33	1.00	-	3.33
	Average	<b>1.15</b>	<b>0.84</b>	<b>0.89</b>	<b>0.04</b>	<b>3.91</b>
<b>Overall average</b>		<b>1.04</b>	<b>0.69</b>	<b>0.85</b>	<b>0.10</b>	<b>3.68</b>

\* Household population including fishermen

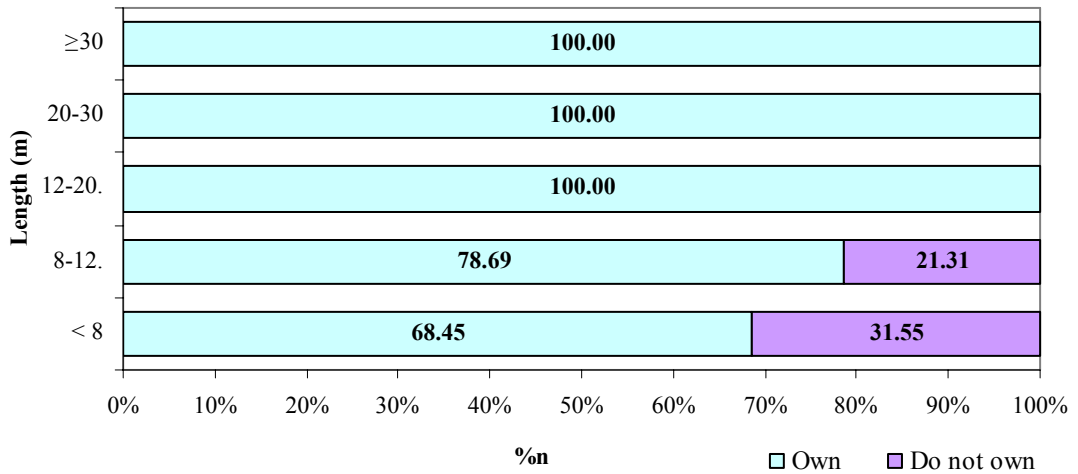
#### 4.2.5. Home ownership status of fishermen

Among the fishermen in the Black Sea Region, all the fishermen have their homes, except for the coastal fishermen. While 76.62% of the fishermen live in their own homes, 23.38% live in rented accommodation (Table 4.18).

**Table 4.18.** Home ownership status of fishermen by length and type categories (%)

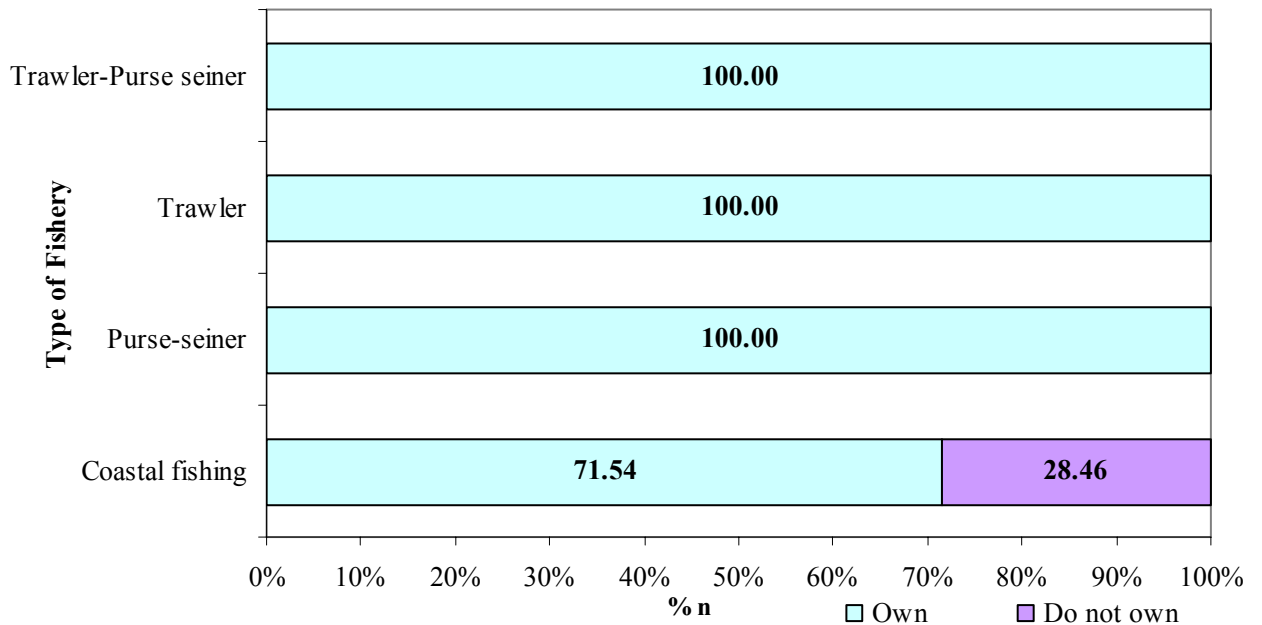
Length (m)	Home ownership		Total	
	Own	Do not own		
<8	41.56	19.15	60.71	
8-12	15.59	4.22	19.81	
12-20	8.44	-	8.44	
20-30	7.79	-	7.79	
≥30	3.25	-	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>58.76</b>	<b>23.38</b>	<b>82.14</b>
Medium and large-scale fishery	Purse-seiner	6.82	-	6.82
	Trawler	9.09	-	9.09
	Trawler-Purse seiner	1.95	-	1.95
	Total	<b>17.86</b>	-	<b>17.86</b>
<b>Overall total</b>		<b>76.62</b>	<b>23.38</b>	<b>100.00</b>

Regarding the length category, 31.55% of the coastal fishermen having the vessels that are less than 8 m in length and 21.31% of those fishermen having the vessels that are 8-12 m in length do not have their own homes and live in a rented accommodation (Figure 4.14).



**Figure 4.14** Home ownership status of fishermen by length category (%)

Regarding the type of fishery, all the fishermen who do not have their homes consist of the coastal fishermen. 71.54% of the coastal fishermen and all of the medium and large-scale fishermen do not have their own homes. (Figure 4.15)



**Figure 4.15.** Home ownership status of fishermen by type of fishery (%)

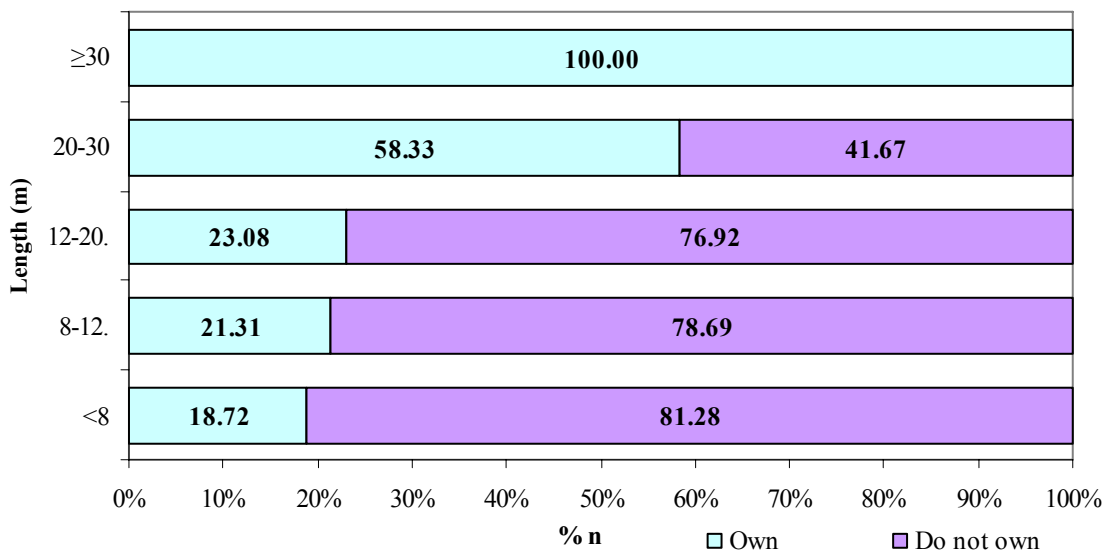
#### 4.2.6. Car ownership status of fishermen

While 74.68% of the fishermen in the Black Sea Region have a car, 25.32% do not have one (Table 4.19).

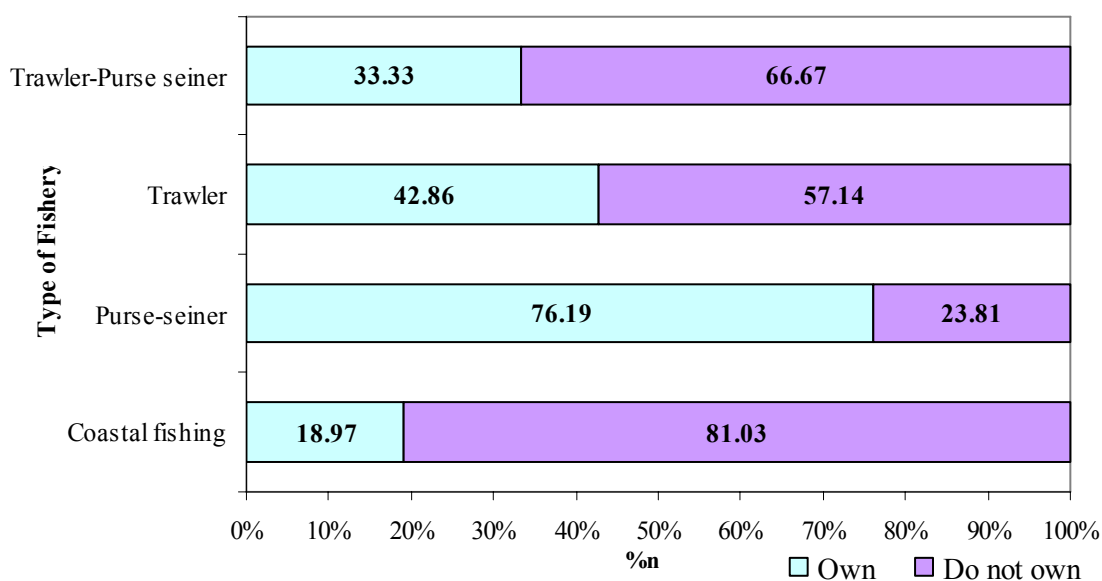
In Düzce, one of the provinces surveyed, all of the fishermen were found out not to have had a car. While Trabzon has the smallest number of fishermen who have a car (11.70%), İstanbul (32.43%) and Zonguldak (32.20%) appear to have the highest. Regarding the length category, it was determined that all of the fishermen in the length category of  $\geq 30$  m and 18.72% of those, who have vessels less than 8 m in length, had a car. As the vessels grew in length, the rate of the fishermen who had a car increased, too (Figure 4.16). Regarding the type of fishery, while the coastal fishermen appear to have the least number of cars (15.58%), the trawler owners appear to have the highest (76.19%) (Figure 4.17).

**Table 4.19.** Car ownership status of fishermen by length and type categories (%)

Length (m)	Car ownership		Total	
	Own	Do not own		
<8	11.36	49.35	60.71	
8-12	4.22	15.59	19.81	
12-20	1.95	6.49	8.44	
20-30	4.54	3.25	7.79	
$\geq 30$	3.25	-	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		15.58	66.56	82.14
Medium and large-scale fishery	Purse-seiner	5.20	1.62	6.82
	Trawler	3.90	5.19	9.09
	Trawler-Purse seiner	0.64	1.31	1.95
	Total	9.74	8.12	17.86
<b>Overall total</b>		<b>25.32</b>	<b>74.68</b>	<b>100.00</b>



**Şekil 4.16.** Car ownership status of fishermen by length category (%)



**Figure 4.17.** Car ownership status of fishermen by type of fishery (%)

#### 4.2.7. Social security status of fishermen

While 72.08% of the fishermen in the Black Sea Region were determined to have been covered by a social security system, 27.92% were determined not to have been covered by any social security system (Table 4.20).

It was found out that the fishermen were covered by the social security systems of SSK, BAĞ-KUR and the Retirement Fund. Further, SSK and BAĞ-KUR have systems that are specific to agricultural sector, and there are holders of the Green Card, a kind of health benefits card. All of the coastal fishermen are covered by the Retirement Fund. These people usually consist of the fishermen engaged in fishing in their spare times and the retired persons. There are no medium and large-scale fishermen who are covered by the Retirement Fund.

One of the reasons of this is related with the age when those fishermen enter the profession. In these types of fishery which have a higher initial investment cost, the fishermen enter the profession beginning to work at younger ages on board the vessels owned by their fathers or using their savings from coastal fishing. Since this requires a long period of time to happen, the retired persons general prefer coastal fishing.

While majority of the coastal fishermen preferred SSK, the majority of the medium and large-scale fishermen preferred BAĞ-KUR. This was the result of the health system applications before 2004. Because, before 2004, while the members of BAĞ-KUR could take the healthcare service of public hospitals, the members of SSK could take the healthcare service of only the Institution's own hospitals. This created a tendency toward BAĞ-KUR among the high-income medium and large-scale fishermen. Besides, all the fishermen having corporate status (if they are not a member of SSK before) had to become a member of BAĞ-KUR. Another reason of the choice of BAĞ-KUR among the high-income fishermen is that they will be entitled to a high retirement salary by paying high amounts of premiums, which is an optional mechanism.

While 19.48% of the fishermen in the Black Sea Region are retired from SSK, 5.84% from the Retirement Fund, 3.57% from BAĞ-KUR, 71.11% of them have not retired from a social security institution, yet (Table 4.20).

#### **4.2.8. Organisation of fishermen**

62.34% of the fishermen in the Black Sea Region were determined to have been a member of a fisheries co-operative (Table 4.21). However, although a high number of members showed interest in co-operative membership, the number of the auction co-operatives remained low. Only one co-operative in the research area engages in auctioning.

As the research revealed, behind the co-operative membership of the fishermen in the Black Sea Region was the aim to be entitled to a licence and to the use of fisherman shelters. More than half of the fishermen (51.29%) responded to a question about the services of co-operatives saying that they had received paperwork help for fishery-related transactions. In particular, the operation of the fisherman shelters emerged as the main service area of the co-operatives in the Eastern Black Sea Region (Table 4.21).



**Table 4.20.** Social security status of fishermen by length and type categories (%)

Social security status	Social security institution	Length (m)					Type of fishery					Total
		<8	8-12	12-20	20-30	≥30	Small-scale fishery Coastal fishing	Medium and large-scale fishery			Total	
								Purse-seiner	Trawler	Trawler-Purse seiner		
Covered by a social security system	Retirement Fund	5.20	2.27	-	-	-	7.47	-	-	-	-	7.47
	SSK	24.35	4.87	1.62	0.65	0.65	29.88	1.62	0.65	-	2.27	32.14
	BAĞ-KUR	8.12	4.22	2.27	6.49	2,28	12.99	3.89	5.19	1.31	10.39	23.38
	Agriculture BAĞ-KUR	1.95	1.30	0.97	0.65	-	3.24	0,32	1,30	-	1.62	4.87
	Agriculture SSK	0.65	0.65	-	-	-	1.30	-	-	-	-	1.30
	Green Card	2.92	-	-	-	-	2.92	-	-	-	-	2.92
Not covered by a social security system		17.52	6.50	3.57	-	0.33	24.35	0.97	1.95	0.65	3.57	27.92
Retired	Retirement Fund	3.90	1.95	-	-	-	5.84	-	-	-	-	5.84
	SSK	14.93	3.25	0.65	0.32	0.33	18.18	1.30	-	-	1.30	19.48
	BAĞ-KUR	2.27	0.32	0.32	0.32	0.33	2.60	0.32	-	0.65	0.97	3.57
	Agriculture BAĞ-KUR	-	-	-	-	-	-	-	-	-	-	-
	Agriculture SSK	-	-	-	-	-	-	-	-	-	-	-
Not retired yet		39.61	14.29	7.47	7.14	2.60	55.52	5.19	9.09	1.31	15.59	71.11

**Table 4.21.** Organisation status of fishermen by length and type categories (%)

Co-operative membership and services		Length (m)					Type of fishery					Total
		<8	8-12	12-20	20-30	≥30	Small-scale fishery (Coastal fishing)	Medium and large-scale fishery			Total	
								Purse-seiner	Trawler	Trawler-Purse seiner		
A member of a co-operative?	Yes	33.12	13.96	5.52	6.49	3.25	47.72	6.17	6.82	1.63	14.62	62.34
	No	27.59	5.85	2.92	1.30	-	34.42	0.65	2.27	0.32	3.24	37.66
Have an assignment in the co-operative?	Yes	4.87	3.90	0.97	4.54	0.98	8.76	1.95	4.22	0.33	6.50	15.26
	No	55.84	15.91	7.47	3.25	2.28	73.38	4.87	4.86	1.63	11.36	84.74
Services provided by co-operative (*)	Shelter	19.80	4.87	1.95	1.30	1.95	24.67	3.57	1.30	0.33	5.20	29.87
	Fish Sale	6.17	2.60	-	0.32	0.33	8.76	0.66	-	-	0.66	9.42
	Credit	1.95	1.95	0.32	0.32	-	3.89	-	0.65	-	0.65	4.54
	Supply of input	2.60	1.30	-	2.60	-	3.89	0.32	1.95	0.34	2.61	6.50
	Training	1.30	0.97	0.32	0.32	-	2.28	0.32	0.31	-	0.63	2.91
	Paperwork	25.32	12.66	4.54	6.49	2.28	38.64	4.86	6.49	1.30	12.65	51.29
	Other	0.97	0.65	0.65	-	-	1.95	-	0.32	-	0.32	2.27

#### 4.2.9. Professional experiences of fishermen

The fishermen in the Black Sea Region were determined to have had a fishing experience of 0-63 years, with an average period of 25.05 years (Table 4.22).

**Table 4.22.** Fishing experience of fishermen by length and type categories (Year)

Length (m)	Minimum	Maximum	Average	
<8	-	63	24.28	
8-12	3	51	24.92	
12-20	5	50	27.88	
20-30	6	55	25.96	
≥30	20	45	30.70	
Type of fishery				
Average of small-scale (Coastal fishing) fishery		-	63	24.55
Medium and large-scale fishery	Purse-seiner	15	50	30.10
	Trawler	5	42	23.32
	Trawler-Purse seiner	10	55	36.83
	Average	5	55	27.38
<b>Overall average</b>		-	<b>63</b>	<b>25.05</b>

Regarding the length category, while the fishermen in the length category of ≥30 m are the most experienced (30.70 years), those in the length category of <8 m are the least experienced (24.28 years). (Table 4.22)

It was understood that the time that the fishermen in the Black Sea Region passed in fishing as a professional fisherman is between 0-63 years according to the length and type categories, with an average period of 20.74 years (Table 4.23).

**Table 4.23.** Professional fishing experience of fishermen by length and type categories (Year)

Length (m)	Minimum	Maximum	Average	
<8	0	63	19.45	
8-12	1	45	21.36	
12-20	5	45	23.38	
20-30	6	55	23.96	
≥30	14	35	26.60	
Type of fishery				
Average of small-scale (Coastal fishing) fishery		0	63	20.04
Medium and large-scale fishery	Purse-seiner	14	40	24.86
	Trawler	5	43	21.50
	Trawler-Purse seiner	10	55	32.67
	Average	5	55	24.00
<b>Overall average</b>		<b>0</b>	<b>63</b>	<b>20.74</b>

Regarding the length category, while the length category of ≥30 m has the highest period professional fishing experience (26.60 years), the length category of <8 m has the least period (19.45 years). Regarding the type of fishery, the medium and large-scale fishermen

have more professional fishing experience (24.00 years) than the coastal fishermen's experience (20.04) (Table 4.23).

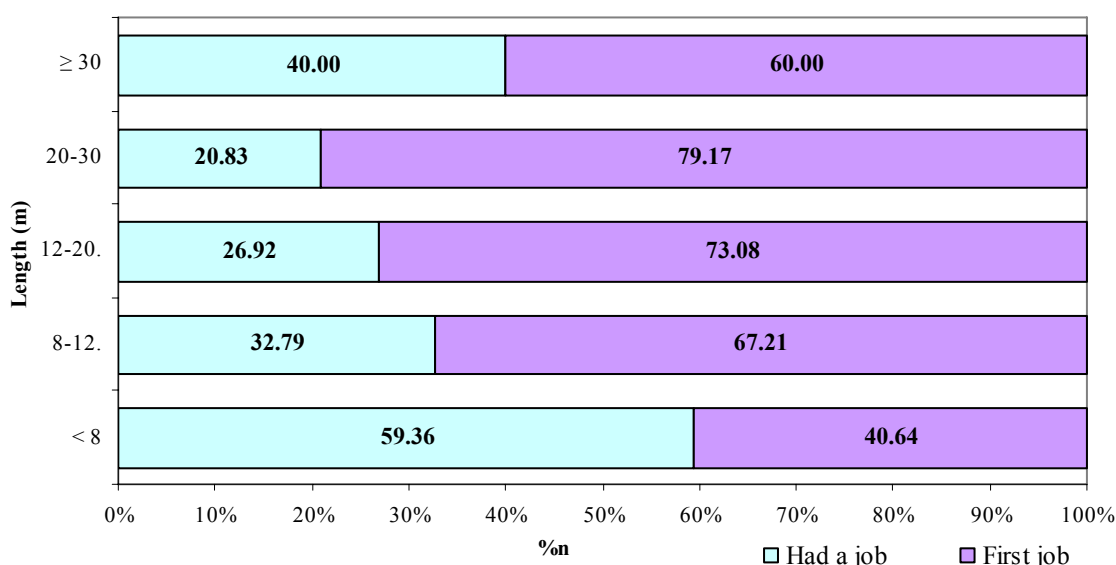
The 4.31-year difference between the average fishing experience of the fishermen in the Black Sea Region and their professional fishing experience was the result of the period spent in the process of making choice between different professions..

47.73% of the fishermen in the Black Sea Region were discovered to have had a previous job (Table 4.24).

**Table 4.24.** Previous job of fishermen by length and type categories (%)

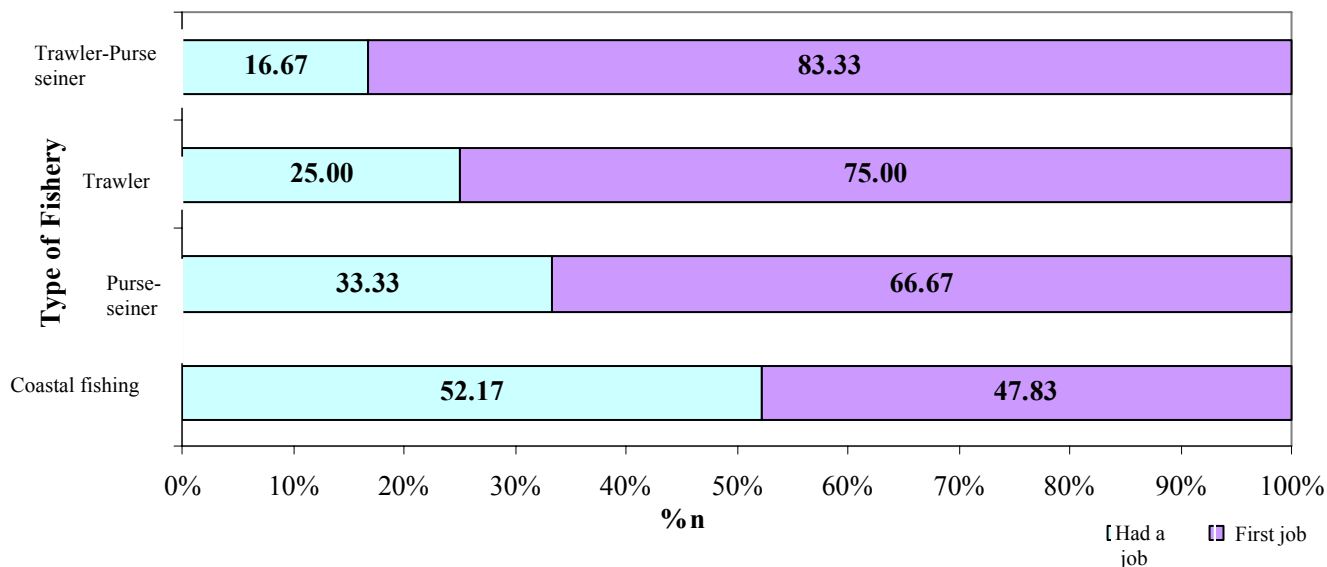
Length (m)	Previous job		Total	
	Had a job	First job		
<8	36.04	24.68	60.71	
8-12	6.49	13.31	19.81	
12-20	2.27	6.17	8.44	
20-30	1.62	6.17	7.79	
≥30	1.30	1.95	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>42.86</b>	<b>39.29</b>	<b>82.14</b>
Medium and large-scale fishery	Purse-seiner	2.27	4.55	6.82
	Trawler	2.27	6.82	9.09
	Trawler-Purse seiner	0.32	1.62	1.95
	Total	<b>4.87</b>	<b>12.99</b>	<b>17.86</b>
<b>Overall total</b>		<b>47.73</b>	<b>52.27</b>	<b>100.00</b>

While the length category comprising the vessels that are less than 8 m in length has the highest percentage of fishermen who had a previous job (59.36%) since most of those fishermen consist of the retired persons, the length category of 20-30 m has the smallest (20.83%) (Figure 4.18).



**Figure 4.18.** Previous job status of fishermen by length category (%)

Regarding the type of fishery, the coastal fishing category has the highest percentage of fishermen who had a previous job (52.17%). As for the medium and large-scale fishery, while the trawler category has the highest percentage of fishermen who had a previous job (33.33%), the trawler-purse seiner category has the smallest (16.67%) (Figure 4.19).



**Figure 4.19.** Previous job status of fishermen by type of fishery (%)

The fishermen in the Black Sea Region were determined to have worked as fishermen for a period of between 0-63 years, with an average period of 23.10 years, and usually in their home places (Table 4.25). However, regarding the purse-seiner category, it was found out that the fishermen in that category operated in areas other than their home places.

**Table 4.25.** Period of fishing of fishermen in their areas by length and type categories (Year)

Length (m)	Minimum	Maximum	Average	
<8	0	63	22.77	
8-12	0	45	21.70	
12-20	0	50	23.92	
20-30	0	55	25.42	
≥30	20	45	30.00	
Type of fishery				
Average of small-scale (Coastal fishing) fishery				
	0	63	22.47	
Medium and large-scale fishery	Purse-seiner	0	45	27.95
	Trawler	0	43	22.18
	Trawler-Purse seiner	10	55	36.83
	Average	0	55	25.98
<b>Overall average</b>	<b>0</b>	<b>63</b>	<b>23.10</b>	

The fishermen in the Black Sea Region were determined to have had a vessel operation period of 0-55 years, with an average period of 16.07 years (Table 4.26).

Regarding the length category, while the fishermen operating the vessels in the length category of ≥30 m have the longest period of operation (18.90 years), those operating the vessels in the length category of <8 m have the shortest (15.20 years). Average vessel

operation period of those fishermen operating the medium and large-scale fishing vessels (17.84 years) is longer than that of the fishermen operating coastal fishing vessels (15.69 years). Further, average vessel operation period of the fishermen operating trawler-purse seiners (25.17 years) is longer than that of the fishermen operating trawlers and purse-seiners. (Table 4.26)

**Table 4.26.** Period of operation of fishing vessels by fishermen by length and type categories (Year)

Length (m)	Minimum	Maximum	Average	
<8	0	55	15.20	
8-12	0	45	16.80	
12-20	1	36	17.31	
20-30	2	55	18.46	
≥30	8	35	18.90	
Type of fishery				
Average of small-scale (Coastal fishing) fishery	0	55	15.69	
Medium and large-scale fishery	Purse-seiner	1	35	17.71
	Trawler	5	35	16.36
	Trawler-Purse seiner	5	55	25.17
	Average	<b>1</b>	<b>55</b>	<b>17.84</b>
<b>Overall average</b>	<b>0</b>	<b>55</b>	<b>16.07</b>	

The fishermen in the Black Sea Region were determined to have had a vessel operation period of 0-55 years, with an average period of 8.92 years in terms of their existing vessels (Table 4.27).

**Table 4.27.** Period of operation of fishing vessels by fishermen by length and type categories (Year)

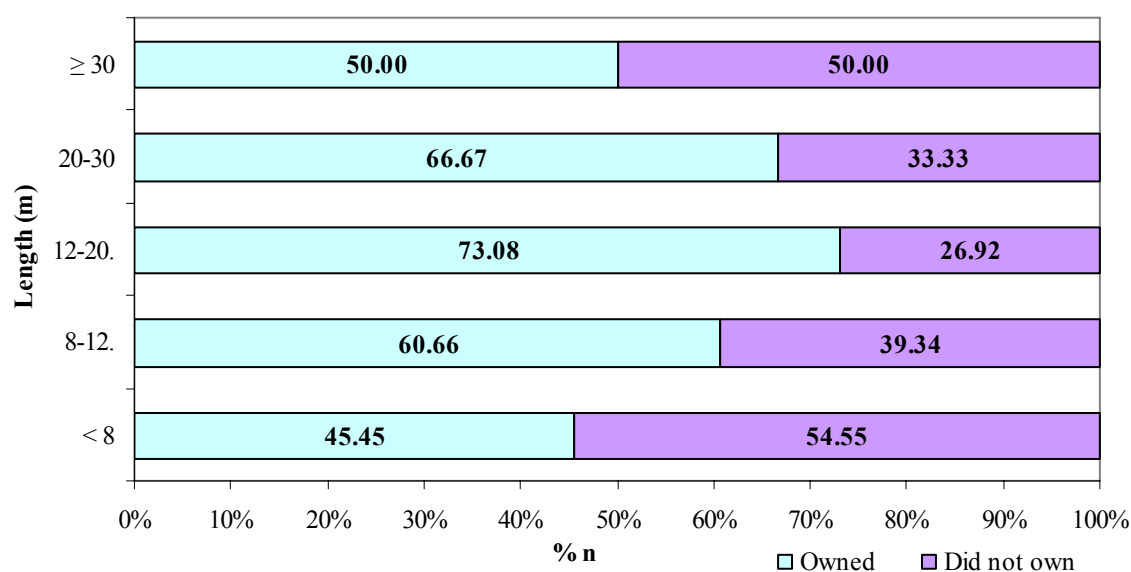
Length (m)	Minimum	Maximum	Average	
<8	0	55	9.29	
8-12	0	22	7.36	
12-20	0	30	8.46	
20-30	2	23	10.29	
≥30	3	15	9.40	
Type of fishery				
Average of small-scale (Coastal fishing) fishery	0	55	8.78	
Medium and large-scale fishery	Purse-seiner	3	30	9.57
	Trawler	0	26	9.71
	Trawler-Purse seiner	1	22	8.67
	Average	<b>1</b>	<b>30</b>	<b>9.54</b>
<b>Overall average</b>	<b>0</b>	<b>55</b>	<b>8.92</b>	

52.60% of the fishermen in the Black Sea Region were discovered to have had their own vessel previously (Table 4.28).

**Table 4.28.** Previous vessel ownership status of fishermen by length and type categories (%)

Length (m)	Previous vessel ownership		Total	
	Owned	Did not own		
<8	27.59	33.12	60.71	
8-12	12.02	7.79	19.81	
12-20	6.17	2.27	8.44	
20-30	5.19	2.60	7.79	
≥30	1.63	1.63	3.25	
Type of fishery				
Average of small-scale (Coastal fishing) fishery		<b>40.91</b>	<b>41.23</b>	<b>82.14</b>
Medium and large-scale fishery	Purse-seiner	3.90	2.92	6.82
	Trawler	6.49	2.60	9.09
	Trawler-Purse seiner	1.30	0.65	1.95
	Total	<b>11.69</b>	<b>6.17</b>	<b>17.86</b>
<b>Overall total</b>	<b>52.60</b>	<b>47.40</b>	<b>100.00</b>	

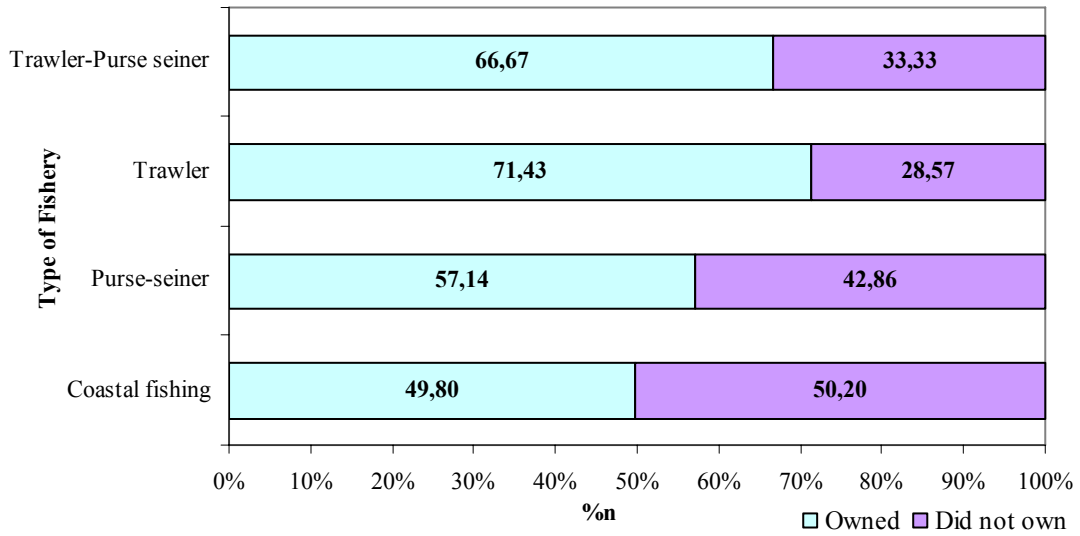
Regarding the length category, the length category of 12-20 m appeared to have comprised the highest number of fishermen who had their own vessels previously (Figure 4.20). Regarding the type of fishery, it was found out that 71.43% of the trawler owners and 49.80% of the vessel owners engaged in coastal fishing had their own vessels previously (Figure 4.21).



**Figure 4.20.** Previous vessel ownership status of fishermen by length category (%)

In the Black Sea Region, 49.34% of the fishermen are doing their fathers' business. Fathers of 9.41% of the fishermen are public officials; however, most of the fishermen (25.98%) appeared to have preferred to work as a public official. More than half of the fishermen (51.62%) answered the question "What would you do if you were not a fisherman?" saying that they would become a fisherman. Although the coastal fishermen are in the lowest income group and they do not want their children to become a fisherman, 41.56% of the children of the coastal fishermen have preferred to become a fisherman. Whereas, it was observed that only a small percentage (2.27%) of the children of the purse-seiner owners, who are in the high income group and who most want to see their children as a fisherman (57.14%), became a fisherman (Figure 4.29).

#### 4.2.10. Reason behind the fishermen's choice to become a fisherman



**Figure 4.21.** Previous vessel ownership status of fishermen by type of fishery (%)

**Table 4.29.** Fishermen's choice of job other than father's business and becoming a fisherman by length and type categories (%)

Length (m)	Father's business						What would he do if he was not a fisherman?							
	Fisherman	Farmer	Tradesman	Worker	Civil servant	Self-employed	Fisherman	Farmer	Tradesman	Worker	Civil servant	Self-employed	Politician	
<8	24.02	5.19	3.90	8.77	7.14	11.69	31.17	0.32	2.92	1.95	15.26	8.12	0.97	
8-12	10.39	1.62	0.65	2.60	1.95	2.60	8.77	-	1.30	0.97	6.17	2.27	0.33	
12-20	5.19	0.33	0.33	1.30	0.32	0.97	5.19	0.33	0.32	0.33	1.62	0.32	0.33	
20-30	7.14	-	-	0.32	-	0.33	5.84	-	0.33	-	1.30	-	0.32	
≥30	2.60	-	0.65	-	-	-	0.65	-	-	-	1.63	0.65	0.32	
<b>Type of fishery</b>														
Small-scale Fishery (Coastal fishing) Total	<b>35.39</b>	<b>6.82</b>	<b>4.56</b>	<b>11.69</b>	<b>9.09</b>	<b>14.62</b>	<b>41.56</b>	<b>0.32</b>	<b>4.22</b>	<b>2.92</b>	<b>21.43</b>	<b>10.39</b>	<b>1.30</b>	
Medium and large-scale fishery	Purse-seiner	5.83	-	0.97	-	-	-	2.27	-	0.33	0.33	2.27	0.65	0.97
	Trawler	6.17	0.32	-	1.30	0.32	0.97	6.82	-	-	-	1.95	0.32	-
	Trawler-Purse seiner	1.95	-	-	-	-	-	0.97	0.33	0.32	-	0.33	-	-
	Total	<b>13.95</b>	<b>0.32</b>	<b>0.97</b>	<b>1.3</b>	<b>0.32</b>	<b>0.97</b>	<b>10.06</b>	<b>0.33</b>	<b>0.65</b>	<b>0.32</b>	<b>4.55</b>	<b>0.97</b>	<b>0.97</b>
<b>Overall total</b>	<b>49.34</b>	<b>7.14</b>	<b>5.53</b>	<b>12.99</b>	<b>9.41</b>	<b>15.59</b>	<b>51.62</b>	<b>0.65</b>	<b>4.87</b>	<b>3.25</b>	<b>25.98</b>	<b>11.36</b>	<b>2.27</b>	

#### 4.2.11. Children of fishermen working as crew members on board the vessel

Most of the fishermen (90.59%) do not want to see their children as a fisherman (Table 4.30).

**Table 4.30.** Choice of fishermen regarding whether their children should be a fisherman or not (%)

Length (m)	Choice of fishermen about their children's future		Total	
	Should be a fisherman	Should do another work		
< 8	2.27	58.44	60.71	
8-12	1.30	18.51	19.81	
12-20	0.65	7.79	8.44	
20-30	4.22	3.57	7.79	
≥30	2.60	0.65	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>3.90</b>	<b>78.24</b>	<b>82.14</b>
Medium and large-scale fishery	Purse-seiner	2.27	4.55	6.82
	Trawler	2.27	6.82	9.09
	Trawler-Purse seiner	0.98	0.97	1.95
	Total	<b>5.51</b>	<b>12.35</b>	<b>17.86</b>
<b>Overall total</b>		<b>9.41</b>	<b>90.59</b>	<b>100.00</b>

Regarding the length category, the length category of 20-30 m has the highest percentage of fishermen (54.17%) who want their children to become a fisherman.

Regarding the type of fishery, on the other hand, the highest percentage (30.85%) of fishermen who want their children to become a fisherman is seen among the medium and large scale fishermen. As for the coastal fishermen, only 4.74% of them want their children to become a fisherman. Among the medium and large-scale fishermen, the owners of trawler-purse seiner constitute the highest percentage of fishermen who want their children to become a fisherman (50.00%). (Table 4.30)

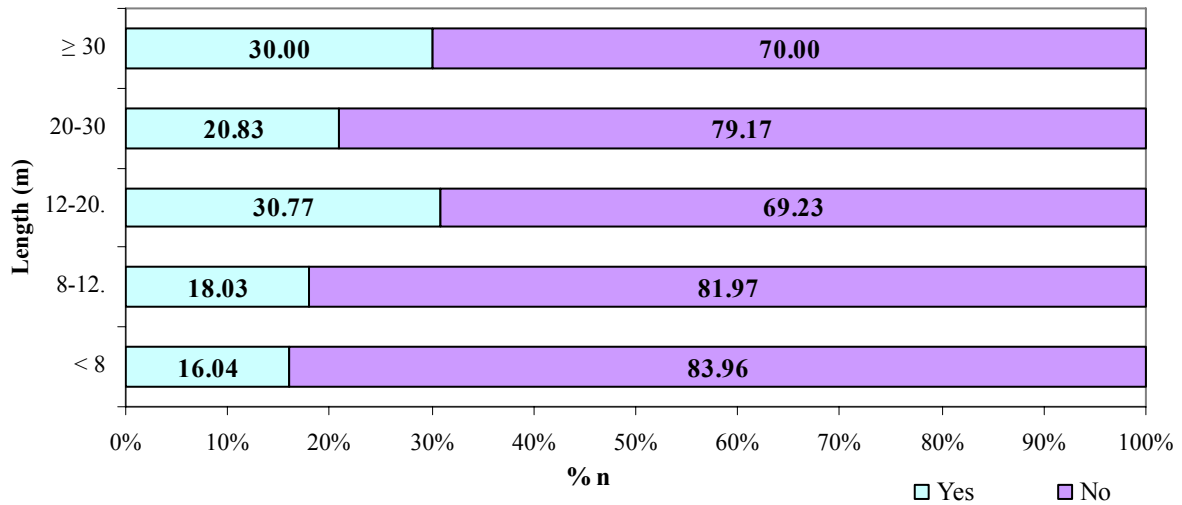
In the Black Sea Region, the children of 18.51% of the fishermen work as crew members on board their vessels. The number of the children working as crew members on board the vessel varied from 1 to 3 children, with an average number of 0.23 children (Table 4.31).

**Table 4.31.** Children of fishermen who work as crew members on board the vessel (%) and their average number (amount) by length and type categories

Length (m)	Children of fishermen work as crew members?					
	Yes	No	Total	Number		
				Max.	Average	
< 8	9.74	50.97	60.71	3	0.19	
8-12	3.57	16.24	19.81	2	0.23	
12-20	2.60	5.84	8.44	2	0.38	
20-30	1.62	6.17	7.79	3	0.33	
≥30	0.98	2.27	3.25	1	0.30	
Type of fishery						
Small-scale (Coastal fishing) Fishery Total		13.96	68.18	82.14	3	0.20
Medium and large-scale fishery	Purse-seiner	1.95	4.87	6.82	3	0.43
	Trawler	1.63	7.46	9.09	1	0.18
	Trawler-Purse seiner	0.97	0.98	1.95	2	0.83
	Total	<b>4.55</b>	<b>13.31</b>	<b>17.86</b>	<b>3</b>	<b>0.35</b>
<b>Overall total</b>		<b>18.51</b>	<b>81.49</b>	<b>100.00</b>	<b>3</b>	<b>0.23</b>

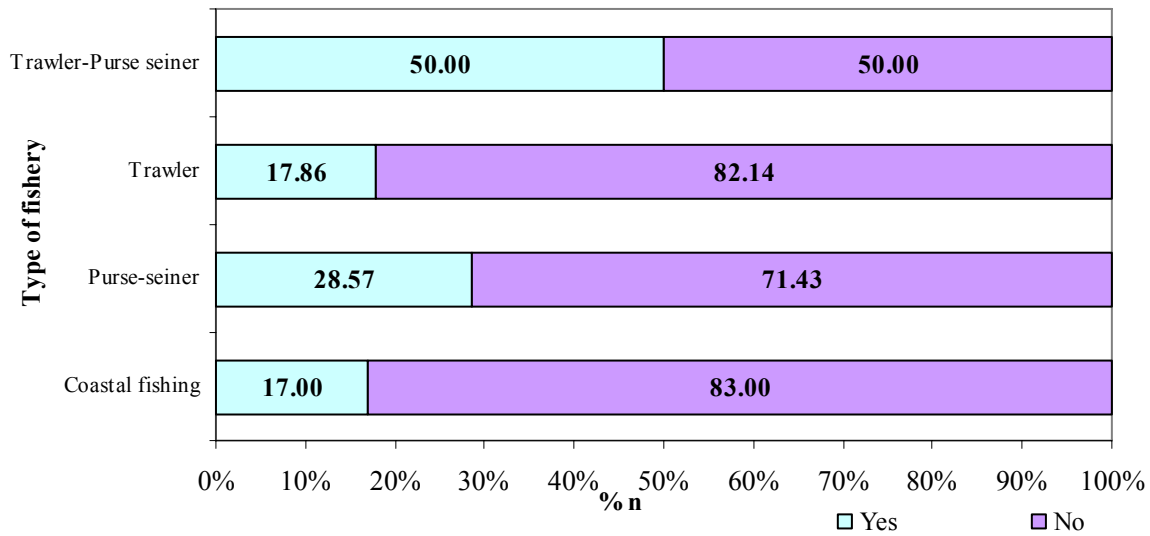


Regarding the length category, it was found out that while the length category of 12-20 m had the highest percentage of children working as crew members on board their fathers' vessels (30.77%), the length category of <8 m had the lowest (16.04%) (Figure 4.22).



**Figure 4.22.** Fishermen who have their children work as crew members on board the vessel by length category (%)

Further, while the trawler-purse seiner group has the highest percentage of fishermen who have their children work as crew members on board their vessels (50.00%), the coastal fishing has the lowest (17.00%) (Figure 4.23).



**Figure 4.23.** Fishermen who have their children work as crew members on board the vessel by type of fishery (%)

A test of variance between the fishermen who want their children to become a fisherman and those who do not want them to become a fisherman was made using single direction variation analysis by type of fishery. The test revealed significant levels of variance (Levene statistic: 51,467,  $p < 0.05$ ). Since the variances are at different levels, a Tamhane test was made. The results of the test are given in Table 4.32.

**Table 4.32.** Test of variance between the fishermen who want their children to become a fisherman and those who do not want their children to become a fisherman type of fishery (P:0.05)

Type of fishery		Comparison groups	Variance	P
Small-scale (Coastal fishing) Fishery (1)		1 - 2	0.35257	0.000*
		1 - 3	0.52400	0.001*
		1 - 4	0.20257	0.131
		1 - 5	0.45257	0.465
Medium and large scale fishery (2)	Purse-seiner (3)	3 - 4	-0.32143	0.144
	Trawler (4)	3 - 5	-0.07143	1.000
	Trawler-Purse seiner (5)	4 - 5	0.25000	0.911

\* : P<0,05

While the level of variance between the coastal fishermen and the medium/large-scale fishermen and between the coastal fishermen and the trawling fishermen was significant (P<0.05), the level of variance among the other types of fishery was insignificant (P>0.05).

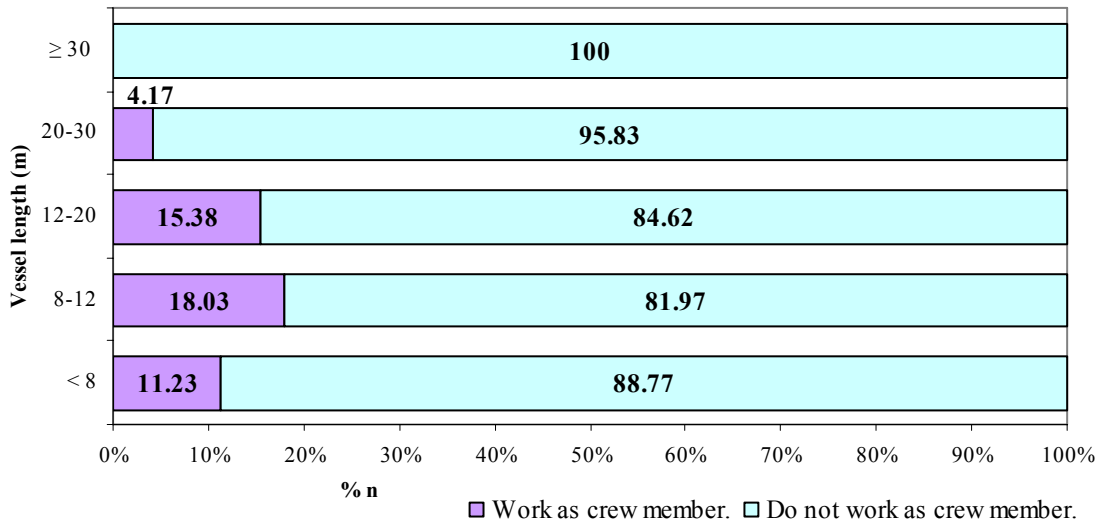
#### 4.2.12. Fishermen working as crew members on board the vessels of other fishermen

In the Black Sea Region, 12.00% of the fishermen work as crew members on board the vessels of other fishermen. Most of the aforesaid fishermen are found among the coastal fishermen who work as crew members on board the purse-seiners during normal fishing year. In addition, the fishermen who lease their carrier boats work as masters of their own vessels and receive a crew member's share in addition to the rent (Table 4.33).

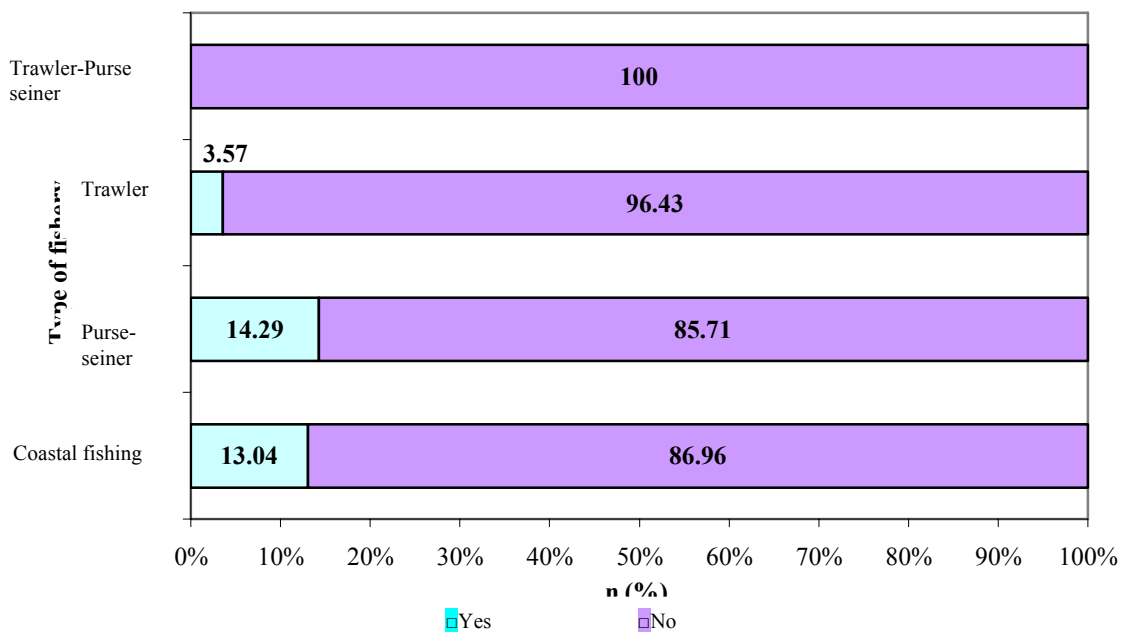
**Table 4.33.** Fishermen who work as a crew member on board the other vessels by length and type categories (%)

Length (m)	Work as a crew member on board another vessel?			
	Yes	No	Total	
<8	6.82	53.89	60.71	
8-12	3.57	16.24	19.81	
12-20	1.30	7.14	8.44	
20-30	0.32	7.47	7.79	
≥30	-	3.25	3.25	
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>10.71</b>	<b>71.43</b>	<b>82.14</b>
Medium and large-scale fishery	Purse-seiner	0.97	5.85	6.82
	Trawler	0.32	8.77	9.09
	Trawler-Purse seiner	-	1.95	1.95
	Total	<b>1.29</b>	<b>16.57</b>	<b>17.86</b>
<b>Overall total</b>		<b>12.00</b>	<b>88.00</b>	<b>100.00</b>

Most of the fishermen who work as crew members on board the vessels of other fishermen are found among the coastal fishermen from the length category of 8-12 m. 18.03% of the fishermen from the aforesaid length category work as crew members on board the purse-seiners. Those fishermen are followed by the vessels owners from the length category of 12-20 m with a rate of 15.38% (Figure 4.24). Regarding the type of fishery, trawler owners are the only ones among whom there are no fishermen who work as crew members on board the vessels of other fishermen (Figure 4.25).



**Figure 4.24.** Fishermen who work as a crew member on board the vessel of another fisherman by length category (%)



**Figure 4.25.** Fishermen who work as a crew member on board the vessel of another fisherman by type of fishery (%)

### 4.3. Economic analysis of the fishing activities in the Black Sea Region

#### 4.3.1. Capital structure of fishermen

Fishing capital of the fishermen in the Black Sea Region was examined in two groups: active capital and passive capital.

##### 4.3.1.1. Active capital

Examination of the active capital of the fishermen in the Black Sea Region, which is used by them for fishing activities, was made under three headings: vessel capital, fishing gear capital, and monetary capital.

##### 4.3.1.1.1 Vessel capital

It was determined that the total vessel capital of the fishermen in the Black Sea Region varied from YTL 7,602 to 1,935,999 by length category and from YTL 10,551 to 525,709 by type of fishery, with an average value of YTL 102,544 (Table 4.34).

Regarding the length category, while the length category of  $\geq 30$  m had the highest amount of vessel capital, the length category of  $< 8$  m had the lowest. It was found that as the vessels grew in length, the total vessel capital increased ( $r=0.7975$ ), and the differences between the total vessel capitals by length category were significant ( $p<0.05$ ). Regarding the type of fishery, on the other hand, while the purse-seiners had the highest amount of vessel capital, the coastal fishing vessels had the lowest. Main boats accounted for the great proportion of the vessel capital (78.81%).

When examining the fishing vessel's capital, only those vessels used for fishing were taken as basis since the main boats account for the great proportion of the total vessel capital of the fishermen (Table 4.34). Those accompanying boats which the fishermen reported other than the main boats are either operated or owned by the fishermen. The total vessel capital comprises all the fishing vessels, regardless of whether they are owned or hired by the fisherman. The total vessel capital is calculated as follows: the value of the hired fishing vessels/carrier boats plus the value of the fisherman's own vessel(s) minus the value of the leased vessel – i.e.,

$$\text{Total Vessel Capital (G)} = (A+B+D)+(C+E) - F.$$

Where,

- A : Value of the main boat
- B : Fishing vessel owned
- C : Fishing vessel hired
- D : Carrier boat owned
- E : Fishing vessel hired
- F : Value of the vessels leased

- (A+B+D) : Value of the vessel owned (owned by the fisherman)
- (C+E) : Value of the vessels hired.

**Table 4.34.** Average vessel capital of fishermen by length and type categories (YTL)

Length (m)	Original vessel value (1) (A)	Accompanying boat (2)		Carrier boat (3)		Vessel Leased (F) (4)	Total vessel capital (5) (G)	(A/G)*100	
		Owner (B)	Lease holder (C)	Owner (D)	Lease holder (E)				
<8	5,807	1,099	-	1,765	-	1,070	7,602	76.40	
8-12	16,115	164	-	-	-	-	16,279	98.99	
12-20	59,808	-	-	5,846	-	5,769	59,885	99.87	
20-30	323,625	-	3,750	8,125	8,333	-	343,833	94.12	
≥30	1,350,000	337,500	-	218,999	29,500	-	1,935,999	69.73	
<b>Type of fishery</b>									
Average of small-scale (Coastal fishing) fishery		9,186	852		1,304	791	10,551	87.06	
Medium and large scale fishery	Purse-seiner	160,714	4,286	120,809	23,571	7,143	-	1,044,857	71.07
	Trawler	183,714	-	-	-	-	-	183,714	100.00
	Trawler-Purse-seiner	304,667	-	-	-	-	-	304,667	100.00
	Average	<b>61,364</b>	<b>1,636</b>	<b>46,127</b>	<b>9,000</b>	<b>2,727</b>	-	<b>525,709</b>	<b>88.95</b>
<b>Overall average</b>		<b>80,815</b>	<b>11,657</b>	<b>292</b>	<b>9,308</b>	<b>1,607</b>	<b>1,136</b>	<b>102,544</b>	<b>78.81</b>

(1) Includes only the main boat (which is indicated in the survey as the primary vessel).

(2) Includes all vessels other than the main boat.

(3) Includes all carrier boats.

(4) Includes all carrier boats and accompanying boats.

(5) Total Vessel Capital (G)= (A+B+C+D+E)-F

#### 4.3.1.1.2. Capital of fishing nets and other fishing gear

Table 4.35 gives the average number and capital of the fishing gear installed on board the fishing vessels of the fishermen in the Black Sea Region.

**Table 4.35.** Breakdown of the fishing gear installed on board the vessel and their capital by length and type categories

Length (m)	n <sub>1</sub> **	Fishing gear capital (YTL)*			
		Minimum	Maximum	Average	
<8	2.86	5	28,500	3,623	
8-12	4.00	500	54,000	9,415	
12-20	3.08	2,650	75,500	19,065	
20-30	2.88	5,500	700,000	162,522	
≥30	2.40	200,000	5,000,000	1,220,000	
Type of fishery					
Average of small-scale (Coastal fishing) fishery		3.14	5	54,000	5,251
Medium and large-scale fishery	Purse-seiner	2.86	4,000	5,000,000	707,872
	Trawler	2.57	2,650	68,000	22,877
	Trawler-Purse seiner	4.17	22,000	608,500	168,925
Average		<b>2.86</b>	<b>5</b>	<b>5,000,000</b>	<b>300,353</b>
<b>Overall average</b>		<b>3.09</b>	<b>5</b>	<b>5,000,000</b>	<b>57,948</b>

(\*) : Fishing rods are not included.

(\*\*) : Number of fishing gear

As it is indicated in Table 4.35 above, the total value of the fishing gear increased depending on the vessel's length ( $r=0.7744$ ). The coastal fishing vessels appear to have the minimum number and value of fishing gear. Trawlers and trawler-purse seiners follow the coastal fishing vessels. Coastal fishing vessels consist of those vessels that are less than 8 m in length, which are usually engaged in hook fishing. Besides, most of the coastal fishermen are the retired persons, as well as those who immigrated to the Black Sea Region time to time. Of those fishermen, while some have recreational fishing licence, some have coastal fishing licence, and 13.90% of them are only engaged in hook fishing. The commercial fishing generally begins with the vessels that are 8-12 m in length, where there are no fishermen who are only engaged in hook fishing.

#### 4.3.1.1.3 Electrical devices and equipment

Table 4.36 gives the average values of the electrical devices and equipment installed on board the fishing vessels in the Black Sea Region by length and type categories.

**Table 4.36.** Average value of the devices installed on board the fishing vessels by length and type categories

<b>Length (m)</b>		<b>Average value of devices (YTL)</b>
<8		201
8-12		1,104
12-20		10,853
20-30		58,484
≥30		324,949
<b>Type of fishery</b>		
Average of small-scale (Coastal fishing) fishery		699
Medium and large-scale fishery	Purse-seiner	175,035
	Trawler	22,109
	Trawler-Purse seiner	94,758
	Average	<b>88,424</b>
<b>Overall average</b>		<b>16,364</b>

Since the electrical devices and equipment on board the fishing vessels are auxiliary means of a fishing vessel, the monetary value of them is shown as included in the vessel value. Therefore, those devices and equipment are incorporated in the total fishing capital. Having a different depreciation life than a vessel and thus requiring a separate calculation for depreciation, Table 4.37 gives a breakdown of minimum, maximum and average current value of each device installed on board the fishing vessels.

**Table 4.37.** Average value of the devices installed on board the fishing vessels by length category (YTL) (\*)

Devices	Value	Length (m)				
		<8	8 - 12	12 - 20	20 - 30	≥30
Radio	Min	70	50	100	200	675
	Max	1,000	1,500	2,000	4,050	2,000
	Average	300	414	860	1,755	1,501
Telephone	Min	-	-	200	200	200
	Max	-	-	500	1,000	500
	Average	400	-	380	375	417
SSB Radio	Min	-	-	-	-	2,700
	Max	-	-	-	4,725	13,780
	Average	-	-	-	-	5822
Sonar	Min	-	-	-	19,000	54,000
	Max	-	-	20,000	18,9000	202,333
	Average	-	-	-	65,063	120,868
Radar	Min	-	-	1,000	2,700	4,000
	Max	-	3,000	10,000	20,000	20,000
	Average	-	-	5,033	8,474	12,138
Generator	Min	-	-	2,000	2,000	5,000
	Max	-	-	7,000	20,000	27,000
	Average	5,500	2,000	3,667	8,278	17,769
Depth finder	Min	250	200	-	-	-
	Max	2,000	2,000	2,000	-	-
	Average	650	738	-	-	-
GPS-Satellite	Min	-	-	1,500	1,500	1,500
	Max	-	-	6000	8,000	10,800
	Average	4,500	1,650	4,033	5,198	4,994
Fishpomp	Min	-	-	1,500	1,500	1,500
	Max	-	-	6,000	8,000	10,800
	Average	4,500	1,650	4,033	5,198	4,994
Fax	Min	-	-	-	-	100
	Max	-	-	600	-	350
	Average	-	-	-	-	225
Eco-sounder	Min	230	675	550	405	2,700
	Max	4,725	6,500	14,000	15,000	10,800
	Average	2,191	2,744	4,255	6,104	5,627
Ice machine	Min	-	-	-	-	28,850
	Max	-	-	-	19,800	39,600
	Average	-	-	-	-	34,225
Auto pilot	Min	-	-	-	-	250
	Max	-	-	-	-	2,700
	Average	-	-	-	-	2,600
Current meter	Min	-	-	-	-	10,800
	Max	-	-	-	10,000	40,000
	Average	-	-	-	-	23,025



#### 4.3.1.1.4 Total fishing capital

All the fishing gears, including the fishing vessel, that are used by fishermen for a fishing operation constitute the total fishing capital. While the vessel capital accounts for 63.89% of the fishing capital of the fishermen in the Black Sea Region, the fishing gear capital accounts for 36.11% (Table 4.38).

**Table 4.38.** Average fishing capital of fishermen by length and type categories (YTL)

Length (m)	Fishing capital*						
	Fishing gear		Vessel		Total		
	Value	%	Value	%	Value	%	
<8	3,623	32.28	7,602	67.72	11,225	100.00	
8-12	9,415	36.64	16,279	63.36	25,694	100.00	
12-20	19,065	24.15	59,885	75.85	78,950	100.00	
20-30	162,522	32.10	343,833	67.90	506,355	100.00	
≥30	1,220,000	38.66	1,935,999	61.34	3,155,999	100.00	
Type of fishery							
Average of small-scale (Coastal fishing) fishery		5,251	33.23	10,551	66.77	15,802	100.00
Medium and large-scale fishery	Purse-seiner	707,872	40.39	1,044,857	59.61	1,752,729	100.00
	Trawler	22,877	11.07	183,714	88.93	206,591	100.00
	Trawler-Purse seine	168,925	35.67	304,667	64.33	473,592	100.00
	Average	<b>300,353</b>	<b>25.00</b>	<b>525,709</b>	<b>75.00</b>	<b>826,062</b>	<b>100.00</b>
<b>Overall average</b>		<b>57,948</b>	<b>36.11</b>	<b>102,544</b>	<b>63.89</b>	<b>160,492</b>	<b>100.00</b>

\* Includes fishing nets and other fishing gear. Fishing rods are excluded.

With regard to the share of vessel capital within the total fishing capital, purse-seiners have the minimum share (59.61%) and trawlers have the maximum share (88.93%). The reasons of this are that the bottom trawl used with the trawlers has a low value, however, that the value of the purse-seiners is high. Fishing gear has the minimum capital since the fishing nets used by trawlers are not much diversified and the value of the towing machine is included in the vessel value.

#### 4.3.1.1.5 Monetary capital

Regarding the length category, the fishermen in the Black Sea Region were determined to have had a monetary capital varying in amount from YTL 464 to 5,000 with an average value of YTL 1,437 (Table 4.39).

**Table 4.39.** Total monetary capital by length category (YTL)

Cash assets		Length (m)					Average
		<8	8-12	12-20	20-30	≥30	
Effects	Cash	46	45	38	0	0	<b>40</b>
	Bank	91	492	-	0	5,000	<b>315</b>
<b>Total</b>		<b>137</b>	<b>537</b>	<b>38</b>	<b>0</b>	<b>5,000</b>	<b>355</b>
Receivables	Due from persons	155	189	654	333	0	<b>213</b>
	Due from banks	0	0	0	0	0	<b>0</b>
	Due from co-operatives	33	82	0	0	0	<b>36</b>
	Due from government	0	0	0	0	0	<b>0</b>
	Due from brokers	0	0	1,096	8,333	0	<b>742</b>
	Other	139	0	77	0	0	<b>91</b>
<b>Total</b>		<b>327</b>	<b>271</b>	<b>1,827</b>	<b>8,667</b>	<b>0</b>	<b>1,082</b>
<b>Overall total</b>		<b>464</b>	<b>808</b>	<b>1,865</b>	<b>8,667</b>	<b>5,000</b>	<b>1,437</b>

As seen in Table 4.39, while the fishermen from the length category of ≥30 m have the highest monetary capital, those from the length category of 8-12 m have the lowest.

Regarding the type of fishery, the fishermen in the Black Sea Region were determined to have had a monetary capital varying in amount from YTL 555 to 8,679 with an average value of YTL 1,437. Further, the medium and large-scale fishermen have a monetary capital (YTL 5,491), which is around 15 times the monetary capital of the coastal fishermen (YTL 555). Out of the monetary capital of the trawler fishermen, 94.03% comes from the receivables due from brokers and 5.96% from the receivables due from persons (Table 4.40).

**Table 4.40.** Total monetary capital of fishermen by type of fishery (YTL)

Cash assets		Type of fishery					Overall average
		Small-scale fishery (Coastal fishing)	Medium and large-scale fishery				
			Purse-seiner	Trawler	Trawler-Purse seiner	Average	
Effects	Cash	45	48	0	0	18	40
	Bank	186	2,381	0	0	909	315
<b>Total Effects</b>		<b>231</b>	<b>2,429</b>	<b>0</b>	<b>0</b>	<b>927</b>	<b>355</b>
Receivables	Due from persons	170	381	518	0	409	213
	Due from banks	0	0	0	0	0	0
	Due from co-operatives	43	0	0	0	0	35
	Due from government	0	0	0	0	0	0
	Due from brokers	0	0	8,161	0	4,155	742
	Other	111	0	0	0	0	91
<b>Total receivables</b>		<b>314</b>	<b>381</b>	<b>8,679</b>	<b>0</b>	<b>4,564</b>	<b>1,082</b>
<b>Overall total</b>		<b>555</b>	<b>2,810</b>	<b>8,679</b>	<b>0</b>	<b>5,491</b>	<b>1,437</b>

#### 4.3.1.1.6 Total active capital

The fishermen in the Black Sea Region were determined to have had an active capital varying in amount from YTL 11,689 to 3,160,999, with an average value of YTL 161,928 years. This variation in the active capital shows that the fishermen are quite different in scale. In particular, this variation is more apparent in the length category of  $\geq 30$  m (Table 4.41).

**Table 4.41.** Average active capital of fishermen by length and type categories (YTL)

Length (m)	Total Active capital					
	Fishing capital	% (*)	Monetary capital	% (*)	Total	
<8	11,225	96.03	464	3.97	11,689	
8-12	25,694	96.95	807	3.05	26,501	
12-20	78,950	97.69	1,865	2.31	80,815	
20-30	506,355	98.32	8,667	1.68	515,022	
$\geq 30$	3,155,999	99.84	5,000	0.16	3,160,999	
<b>Type of fishery</b>						
Average of small-scale fishery (Coastal fishing)		15,802	96.60	555	3.40	16,357
Medium and large-scale fishery	Purse-seiner	1,752,729	99.84	2,810	0.16	1,755,539
	Trawler	206,591	95.97	8,679	4.03	215,270
	Trawler-Purse seiner	473,592	100.00	0	0.00	473,592
	Average	<b>826,062</b>	<b>98.00</b>	<b>5,491</b>	<b>2.00</b>	<b>831,553</b>
<b>Overall average</b>		<b>160,492</b>	<b>96.83</b>	<b>1,436</b>	<b>3.17</b>	<b>161,928</b>

#### 4.3.1.2. Passive capital

The fishermen in the Black Sea Region were determined to have had a passive capital, which consists of the sum of foreign capital (value of the hired vessel, debt + debt interest) and equity capital, varying in amount from YTL 11,689 to 3,160,999, with an average value of YTL 161,928 (Table 4.42).

**Table 4.42.** Passive capital of fishermen and its components by length and type categories (YTL)

Length (m)	Passive capital			Total	
	Foreign capital		Equity capital		
	Value of the hired vessel	Debt + Interest			
<8	0	1,560	10,129	11,689	
8-12	0	3,508	22,993	26,501	
12-20	0	12,157	68,658	80,815	
20-30	2,917	56,317	455,788	515,022	
≥30	5,200	315,500	2,840,299	3,160,999	
Type of fishery					
Average of small-scale fishery (Coastal fishing)		0	2,046	14,311	16,357
Medium and large scale fishery	Purse-seiner	5,810	192,333	1,557,396	1,755,539
	Trawler	0	21,244	194,026	215,270
	Trawler-Purse seiner	0	29,503	444,089	473,592
	Average	<b>2,218</b>	<b>87,470</b>	<b>742,447</b>	<b>831,553</b>
<b>Overall average</b>		<b>396</b>	<b>17,300</b>	<b>144,231</b>	<b>161,928</b>

Regarding the length and type categories, the average passive capital (YTL 161,928), which shows the resources of the assets, of the fishermen in the Black Sea Region, YTL 17,300 in average is comprised of the debts plus interest (Table 4.42).

**Table 4.43.** Debts of the vessels by length and type categories (YTL)

Liabilities	Length (m)					Type of fishery					Overall average
	< 8	8-12	12-20	20-30	≥30	Small-scale fishery (Coastal fishing)	Medium and large-scale fishery			Average	
							Purse-seiner	Trawler	Trawler-purse seiner		
Due to persons	1,032	1,706	5,326	23,125	283,500	<b>1,185</b>	149,691	13,286	1,668	<b>64,100</b>	<b>12,420</b>
Due to crew members	5	-	19	625	10,000	<b>4</b>	4,762	18	2,500	<b>2,100</b>	<b>378</b>
Due to banks*	197	1,137	5,859	14,234	-	<b>455</b>	12,643	5,146	12,586	<b>32,396</b>	<b>1,949</b>
Due to co-operatives	39	225	125	-	-	<b>83</b>	-	116	-	-	<b>78</b>
Due to government	80	5	-	-	-	<b>61</b>	-	-	-	-	<b>51</b>
Fuel	2	-	115	-	1,000	<b>1</b>	476	107	-	-	<b>43</b>
Fishing Nets	52	185	58	10,208	17,000	<b>83</b>	18,571	-	4,416	<b>7,572</b>	<b>1,420</b>
Other	153	250	654	8,125	4,000	<b>174</b>	6,190	2,571	8,333	<b>4,581</b>	<b>961</b>
<b>Total</b>	<b>1,560</b>	<b>3,508</b>	<b>12,157</b>	<b>56,317</b>	<b>315,500</b>	<b>2,046</b>	<b>192,333</b>	<b>21,244</b>	<b>29,503</b>	<b>87,470</b>	<b>17,300</b>

\* : (Debt + Interest)

As it is indicated in Table 4.43, the fishermen's debts vary from the liabilities due to persons to those due to the government. With regard to the length and type categories, the liabilities due to persons (broker) account for the great proportion of the fishermen's debts.

Regarding the length category, the length category of ≥30 m appears to comprise the greatest proportion of the liabilities due to persons. The reason of this is that that length category contains trawlers, which have a higher need for operating capital. To meet the need for operating capital, the fishermen in the aforesaid category take debts from persons (broker) in exchange for their catches.

Regarding the type of fishery, too, the liabilities due to persons (broker) account for the great proportion of the fishermen's debts. 57.92% and 73.28% of the debts of the coastal fishermen and the medium and large-scale fishermen respectively are comprised of the liabilities due to persons. Trawler fishermen appear to have the highest percentage of liabilities due to persons (77.83%). In contrary, the owners of trawler-purse seiner have the minimum percentage of liabilities due to persons among the medium and large-scale fishermen. The fishermen from this type mostly have liabilities due to banks (42.66%).

Table 4.44 gives the breakdown of the capital structure and of the rates of the fishermen in the Black Sea Region by length and type categories.

**Table 4.44.** Capital structure and ratios of fishermen by length and type categories (YTL)

Length (m)		Active capital			Passive capital			
		Fishing capital	Monetary capital	Total	Foreign capital	Equity capital	Total	
<8	V*	11,225	464	11,689	1,560	10,129	11,689	
	%	96	4	100	13	87	100	
8-12	V	25,694	807	26,501	3,508	22,993	26,501	
	%	97	3	100	13	87	100	
12-20	V	78,950	1,865	80,815	12,157	68,658	80,815	
	%	98	2	100	15	85	100	
20-30	V	506,355	8,667	515,022	59,234	455,788	515,022	
	%	98	2	100	12	88	100	
≥30	V	3,155,999	5,000	3,160,999	320,700	2,840,299	3,160,999	
	%	100	0	100	10	90	100	
Overall average		V	160,492	1,437	161,929	17,696	144,233	161,929
		%	99.00	1.00	100.00	10.93	89.07	100.00
<b>Type of fishery</b>								
Coastal fishing		V	15,802	555	16,357	2,046	14,311	16,357
		%	94	6	100	12	88	100
Medium and large-scale fishery	Purse-seiner	V	1,752,729	2,810	1,755,539	198,143	1,557,396	1,755,539
		%	100	0	100	11	89	100
	Trawler	V	206,591	8,679	215,270	21,244	194,026	215,270
		%	96	4	100	10	90	100
	Trawler-Purse seiner	V	473,592	0	473,592	29,503	444,089	473,592
		%	100	0	100	6	94	100
	Average	V	826,062	5,491	831,553	89,688	741,865	831,553
		%	98	2	100	10	90	100
Overall average		V	<b>160,491</b>	<b>1,437</b>	<b>161,928</b>	<b>17,697</b>	<b>144,231</b>	<b>161,928</b>
		%	<b>99.00</b>	<b>1.00</b>	<b>100.00</b>	<b>10.93</b>	<b>89.07</b>	<b>100.00</b>

\*: Value (YTL)

### 4.3.2 Activity results

#### 4.3.2.1. Gross receipts

The fishermen in the Black Sea Region were determined to have had gross receipts amounting to YTL 10.35 – 2,955,500, with an average amount of YTL 93,788 (Table 4.45).

**Table 4.45.** Value of the catches of the fishing vessels by length and type categories (Gross receipts) (YTL)

Length (m)	Minimum	Max.	Average
<8	10.35	80,213	15,035
8-12	5,750.00	68,310	27,516
12-20	28,175.00	279,450	76,096
20-30	30,303.00	929,488	318,175
≥30	885,500.00	2,955,500	1,478,192
Type of fishery			
Average of small-scale (Coastal fishing) fishery	10.35	100,625	19,075
Medium and large-scale fishery	Purse-seiner	30,671.00	2,955,500
	Trawler	28,175.00	590,755
	Trawler-Purse seiner	69,000.00	430,043
	Average	<b>33,581.00</b>	<b>1,476,125</b>
<b>Overall average</b>	<b>10.35</b>	<b>2,955,500</b>	<b>93,788</b>

Regarding the length category, the length category of <8 m has the lowest gross receipts. The reason of this is the presence of fishermen who do not engage in commercial fishing although they have been licensed to do so. Purse-seiners have the highest gross receipts. These vessels apparently have much more gross receipts than the other fishing vessels. In particular, the purse-seiners that are 30 m or more in length have gross receipts which are 4.65 times of the length category of 20-30 m and 3 times the length category of ≥30 m. It was found that as the vessels grew in length, higher amounts of gross receipts were earned. However, both length category and type of fishery were examined to determine which one of them had an effect on gross receipts.

Regarding the type of fishery, on the other hand, while the purse-seiners had the highest gross receipts, the coastal fishing vessels had the lowest. A test of variance between the income was made using single direction variation analysis by type of fishery. The test revealed significant levels of variance ( $F=125.744$ ,  $P=0.000$  and  $p<0.05$ ). Since the categories have different levels of variances, a Tamhane test was made. The results of the test are given in Table 4.46.

As it is indicated in Table 4.46, the level of variance between the coastal fishing and the medium/large-scale fishing and between the purse-seiners and trawlers was significant ( $P<0.05$ ) in terms of gross receipts.

**Table 4.46.** Test of variance between the mean gross receipts by type of fishery (P:0.05)

Type of fishery		Comparison groups	Gross receipts variance (YTL)	P
Small-scale (Coastal fishing) Fishery (1)		1 - 2	- 363.820	0.000*
		1 - 3	- 757.282	0.000*
		1 - 4	- 113.217	0.000*
		1 - 5	- 156.179	0.178
Medium and large scale fishery (2)	Purse-seiner (3)	3 - 4	644.065	0.001*
	Trawler (4)	3 - 5	601.103	0.003*
	Trawler-Purse seiner (5)	4 - 5	- 42.962	0.981

\* : P<0,05

### 4.3.2.2. Gross product

The gross product of the fishermen in the Black Sea was calculated by adding the fishery income that the fishermen earned from non-fishing activities to the gross receipts earned from the catches of one fishing year or from the catches of coastal fishing (Table 4.47).

**Table 4.47.** Average gross product by length and type categories (YTL)

Length (m)	Gross receipts	Non-operating fishing income	Gross receipts	
<8	15,035	618	15,652	
8-12	27,516	833	28,349	
12-20	76,096	2,175	78,271	
20-30	318,175	1,667	319,842	
≥30	1,478,192	0	1,478,192	
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery		19,075	657	19,732
Medium and large-scale fishery	Purse-seiner	889,949	2,571	892,521
	Trawler	149,274	1,520	150,794
	Trawler-Purse seiner	198,681	0	198,681
	Average	<b>437,467</b>	<b>1,755</b>	<b>439,223</b>
<b>Overall average</b>		<b>93,788</b>	<b>691</b>	<b>94,479</b>

### 4.3.2.3. Operating expenses

Operating expenses are the sum of the costs incurred, less the active capital interest which is used to calculate the net receipts. Operating expenses were examined in two groups: fixed costs and variable costs.

#### 4.3.2.3.1 Variable costs

Table 4.48 gives the breakdown of the variable costs incurred by the fishermen in the Black Sea Region by length and type categories.



**Table 4.48.** Variable costs of the vessels by length and type categories (YTL)

Expense items	Length (m)					Type of fishery					Overall average	
						Small-scale fishery	Medium and large-scale fishery					
	< 8	8 - 12	12 - 20	20 - 30	≥30	(Coastal fishing)	Purse-seiner	Trawler	Trawler-Purse seiner	Average		
Fuel (including Excise Tax)	168	1,475	8,673	37,232	174,150	<b>724</b>	96,691	21,566	27,408	<b>50,887</b>	<b>9,682</b>	
Fuel (excluding Excise Tax)	1,251	1,298	10	0	0	<b>1,238</b>	10	0	0	<b>4</b>	<b>1,017</b>	
Ice purchased	1	1	355	3,358	3,925	<b>9</b>	2,868	2,105	1,317	<b>2,310</b>	<b>420</b>	
Crates purchased	23	69	840	10,348	49,125	<b>53</b>	29,771	3,495	5,580	<b>13,755</b>	<b>2,500</b>	
Transportation	85	257	842	9,198	53,400	<b>138</b>	33,257	1,732	4,375	<b>14,057</b>	<b>2,624</b>	
Vessel maintenance	445	877	3,098	10,750	32,140	<b>580</b>	20,312	6,354	7,583	<b>11,817</b>	<b>2,587</b>	
Repair of net	270	568	877	4,479	19,950	<b>350</b>	14,476	482	750	<b>5,854</b>	<b>1,347</b>	
Repair of vehicles	30	1	0	83	500	<b>30</b>	1	71	0	<b>37</b>	<b>41</b>	
Commission	2,001	3,589	9,926	41,501	202,067	<b>2,530</b>	120,489	19,471	25,915	<b>58,744</b>	<b>12,558</b>	
Labour	Wage of transport personnel	0	0	1,644	6,129	48,410	<b>0</b>	32,093	0	0	<b>12,254</b>	<b>2,188</b>
	Crew member's share	4,297	9,164	24,283	92,800	414,544	<b>5,683</b>	260,601	39,641	57,705	<b>125,978</b>	<b>27,164</b>
	Food	466	960	3,212	14,040	33,600	<b>687</b>	24,466	6,095	7,333	<b>13,244</b>	<b>2,929</b>
	Clothes	92	151	328	626	3,610	<b>112</b>	2,173	321	497	<b>1,047</b>	<b>279</b>
<b>Total</b>	<b>9,129</b>	<b>18,410</b>	<b>54,087</b>	<b>230,544</b>	<b>1,035,421</b>	<b>12,134</b>	<b>637,208</b>	<b>101,333</b>	<b>138,464</b>	<b>309,990</b>	<b>65,337</b>	

\* Includes the repair costs of the vehicles used for fishing.

As it is indicated in Table 4.48, the labour costs account for the highest proportion of the expense items. On the other hand, crew member's share accounts for the highest proportion of the labour costs. Commissions and fuel without Excise Tax respectively follow the labour costs, having the second and third highest proportions within the variable costs.

Regarding the length category, while the length category of <8 m appears to have the highest amount of variable costs, the length category of  $\geq 30$  m has the lowest. Total variable costs increased in line with the growth in length ( $r=0.8186$ ).

Regarding the type of fishery, the variable costs seen in the medium and large-scale fishery are 25.54 times of the variables costs of coastal fishing. In the medium and large-scale fishery, while purse-seiners have the highest amount of variable costs, trawlers have the lowest. Further, the variable costs of purse-seiners are around 6 times the costs of trawlers and around 4 times the costs of trawler-purse seiners. Crew member's share and commissions account for the great proportion of the variable costs of purse-seiners. The reasons of this are the use of 10-15 crew members to drop/haul surrounding nets from/on board the vessel, i.e., purse-seiners, and also according to the size of both the vessel and the fishing net, as well as payment of higher amount of commission due to higher amount of catch. With regard to trawlers, on the other hand, the net is hauled on board the vessel by a hauler. Thus, trawlers need fewer crew members when compared to purse-seiners. This means lower crew member's share for trawlers.

Share of each expense item within the variable costs is calculated. Table 4.49 gives the calculated shares.

Crew member's share accounts for the highest proportion of the variable costs of the fishermen in the Black Sea, as reflected in Table 4.49. Labour costs account for 46.49% of the variable costs when taken together with the expenditures spent on crew members' clothes and food. Besides, crew member's share alone accounts for 41.58% of the variable costs. Crew members' food expenditures have a share of 4.48% in average. Although this amounts to YTL 24,466, which is considerably a high value, for purse-seiners, the expenditures spent on food for purse-seiners have a smaller share within the variable costs in proportional to other types of fishery.

For the Black Sea fishery, the proportion of the crew member's share appeared to have varied from 20% to 66% of the catch amount. The ratio of crew member's share to be paid to crew members is determined according to the catch amount rather than the length of fishing vessels. As the catch amount increases, the crew member's share decreases proportionally. This ensures a stable crew member's share. It was observed that, in particular in the same region, the crew member's shares have similar values.

Regarding the length category, the length category of 8-12 m has the highest percentage of crew member's shares (49.78%) within the variable costs. However, the crew member's share has the lowest value proportionally in the length category of  $\geq 30$  m. This shows that as the vessels grow in length, the crew member's share sees a proportional decrease ( $r=0.8757$ ).

Regarding the type of fishery, also, the crew member's share accounts for the highest proportion of the variable costs of both the medium/large-scale and coastal fishing. Commissions paid for sales of fish (19.22%) follow the crew member's share, having the second highest proportion within the variable costs.

**Table 4.49.** Share of the variable cost items within the variable costs by length and type categories (%)

Expense items		Length (m)					Type of fishery				Average	
							Small-scale fishery (Coastal fishing)	Medium and large-scale fishery				
		< 8	8– 12	12 - 20	20– 30	≥30		Purse-seiner	Trawler	Trawler-Purse seiner		Average
Fuel (including Excise Tax)		1.84	8.01	16.04	16.15	16.82	<b>5.97</b>	15.17	21.28	19.79	<b>16.42</b>	<b>14.82</b>
Fuel (excluding Excise Tax)		13.70	7.05	0.02	-	-	<b>10.20</b>	-	-	-	-	<b>1.56</b>
Ice purchased		0.01	0.01	0.66	1.46	0.38	<b>0.07</b>	0.45	2.08	0.95	<b>0.75</b>	<b>0.64</b>
Fish Crates		0.25	0.37	1.55	4.49	4.74	<b>0.44</b>	4.67	3.45	4.03	<b>4.44</b>	<b>3.83</b>
Transportation		0.93	1.40	1.56	3.99	5.16	<b>1.14</b>	5.22	1.71	3.16	<b>4.53</b>	<b>4.02</b>
End-of-season maintenance		4.87	4.76	5.73	4.66	3.10	<b>4.78</b>	3.19	6.27	5.48	<b>3.81</b>	<b>3.96</b>
Repair of net		2.96	3.09	1.62	1.94	1.93	<b>2.88</b>	2.27	0.48	0.54	<b>1.89</b>	<b>2.06</b>
Repair of vehicles		0.33	0.01	-	0.04	0.05	<b>0.25</b>	-	0.07	-	<b>0.01</b>	<b>0.06</b>
Commission		21.92	19.50	18.35	18.00	19.52	<b>20.85</b>	18.91	19.21	18.72	<b>18.95</b>	<b>19.22</b>
Labour	Wage of transport personnel	-	-	3.04	2.66	4.68	-	5.04	-	-	<b>3.95</b>	<b>3.35</b>
	Crew member's share	47.07	49.78	44.90	40.25	40.04	<b>46.84</b>	40.90	39.12	41.68	<b>40.64</b>	<b>41.58</b>
	Food	5.10	5.21	5.94	6.09	3.25	<b>5.66</b>	3.84	6.02	5.30	<b>4.27</b>	<b>4.48</b>
	Clothes	1.01	0.82	0.61	0.27	0.35	<b>0.92</b>	0.34	0.32	0.36	<b>0.34</b>	<b>0.43</b>
<b>Total</b>		100.00	100.00	100.00	100.00	100.00	<b>100.00</b>	100.00	100.00	100.00	<b>100.00</b>	<b>100.00</b>

#### 4.3.2.3.2. Fixed costs

Fixed costs are the sum of the depreciations calculated for the total fishing capital, the provisions for labour of fishermen and the children working as crew members on board the vessel, and the other expense items that are independent of the catch amount (membership dues to associations, co-operatives, rent of offices, storages and icehouses, shelter fee, water and electricity fees, and vessel's rent).

Separate depreciation rates were calculated for fishing vessels, electrical devices on board the fishing vessels, and fishing gear (Table 4.50).

**Table 4.50.** Depreciation costs by length and type categories (YTL)

Length (m)	Depreciations			Total	
	Fishing gear	Vessel*	Devices		
<8	594	328	13	935	
8-12	1,570	654	74	2,298	
12-20	2,414	2,260	724	5,398	
20-30	10,995	11,072	3,901	25,967	
≥30	61,000	62,915	21,674	145,589	
<b>Type of fishery</b>					
Average of small-scale (Coastal fishing) fishery		868	425	47	1,339
Medium and large-scale fishery	Purse-seiner	35,706	33,995	11,675	81,376
	Trawler	3,827	6,171	1,475	11,473
	Trawler-Purse seiner	11,140	10,142	6,320	27,602
	Average	<b>17,029</b>	<b>18,142</b>	<b>5,898</b>	<b>41,069</b>
<b>Overall average</b>		<b>3,712</b>	<b>3,425</b>	<b>1,091</b>	<b>8,228</b>

\* : Depreciations include both accompanying boats and carrier boats.

As it is indicated in Table 4.50, higher levels of depreciation occurred according to the length category ( $r=0.7972$ ). Having expensive fishing gears, the length category of  $\geq 30$  m sees higher depreciation costs when compared to other categories.

The provision for family labour of the fishermen in the Black Sea was YTL 5,710 in average for fishermen and his children working as crew members on board the vessel (Table 4.51).

**Table 4.51.** Provision for labour of fisherman and his children by length and type categories (YTL)

Length (m)	Provision for Family Labour (YTL)		Total	
	Children	Fisherman		
<8	6,110	3,262	3,873	
8-12	1,097	4,781	5,878	
12-20	1,932	5,022	6,954	
20-30	3,313	9,939	13,252	
≥30	4,084	13,612	17,696	
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery		716	3,638	4,354
Medium and large-scale fishery	Purse-seiner	4,468	10,426	14,894
	Trawler	1,194	7,688	8,882
	Trawler-Purse seiner	7,217	8,717	15,934
	Average	<b>3,101</b>	<b>8,846</b>	<b>11,947</b>
<b>Overall average</b>		<b>1,142</b>	<b>4,658</b>	<b>5,710</b>

When calculating the provision for labour of fisherman and his children working as crew members on board the vessel, income changes arising from the length category and the type of fishery were taken into consideration. For example, the provision for family labour of the fishermen working on board the purse-seiners is higher than that of the coastal fishermen since the former earn a higher annual income. While the lowest provision for labour calculated was for the length category of <8 m with an amount of YTL 3,873, the highest was for the length category of ≥30 m with an amount of YTL 17,696.

It was found out that the fixed fishing expenses in the Black Sea Region varied in amount from YTL 4,870 to 189,452, with an average amount of YTL 15,275. While the lowest amount of fixed costs calculated was for the vessels less than 8 m in length and for coastal fishing vessels, the highest was for the vessels more than 30 m in length and for purse-seiners (Table 4.52).

**Table 4.52.** Total fixed operating expenses by length and type categories (YTL)

Length (m)	Fixed operating expenses				
	Depreciation	PFL*	Other expenses	Total	
<8	935	3,873	62	4,870	
8-12	2,298	5,878	47	8,223	
12-20	5,398	6,954	190	12,542	
20-30	25,967	13,252	5,448	44,667	
≥30	145,589	17,696	26,167	189,452	
<b>Type of fishery</b>					
Average of small-scale (Coastal fishing) fishery		1,339	4,354	59	5,752
Medium and large scale fishery	Purse-seiner	81,376	14,894	17,734	114,004
	Trawler	11,473	8,882	796	21,151
	Trawler-Purse seiner	27,602	15,934	371	43,907
	Average	<b>41,069</b>	<b>11,947</b>	<b>7,217</b>	<b>60,233</b>
<b>Overall average</b>		<b>8,228</b>	<b>5,710</b>	<b>1,337</b>	<b>15,275</b>

\* PFL: Provision for family labour

It was determined that the total operating (fishing) expenses of the fishermen in the Black Sea Region varied from YTL 13,999 to 1,224,873 by length category and from YTL 17,904 to 751,212 by type of fishery, with an average amount of YTL 80,612 (Table 4.53).

**Table 4.53.** Total operating expenses by length and type categories (YTL)

Length (m)	Operating expenses				Total	
	Fixed		Variable			
	Value	%	Value	%		
<8	4,870	35.00	9,129	65.00	13,999	
8-12	8,223	31.00	18,410	69.00	26,633	
12-20	12,542	19.00	54,087	81.00	66,629	
20-30	44,667	16.00	230,544	84.00	275,211	
≥30	189,452	15.00	1,035,421	85.00	1,224,873	
<b>Type of fishery</b>						
Average of small-scale (Coastal fishing) fishery		5,752	32.00	12,152	68.00	17,904
Medium and large scale fishery	Purse-seiner	114,004	15.00	637,208	85.00	751,212
	Trawler	21,151	17.00	101,333	83.00	122,484
	Trawler-Purse seiner	43,907	24.00	138,464	76.00	182,371
	Average	<b>60,233</b>	<b>16.00</b>	<b>309,990</b>	<b>84.00</b>	<b>369,077</b>
<b>Overall average</b>		<b>15,275</b>	<b>100.00</b>	<b>65,337</b>	<b>100.00</b>	<b>80,612</b>

#### 4.3.2.4. Net receipts

Net receipts are the yield of the active capital spent on fishing activities and were calculated by subtracting the fishing expenses from the gross product. It was determined that the net receipts of the fishermen in the Black Sea Region varied from YTL 1,653 to 253,319 by length category and from YTL 1,828 to 70,146 by type of fishery, with an average amount of YTL 13,867 (Table 4.54).

**Table 4.54.** Net receipts of fishing vessels by length and type categories (YTL)

Length (m)	Gross receipts	Operating expenses	Net receipts
<8	15,652	13,999	1,653
8-12	28,349	26,633	1,716
12-20	78,271	66,629	11,642
20-30	319,842	275,211	44,631
≥30	1,478,192	1,224,873	253,319
<b>Type of fishery</b>			
Average of small-scale (Coastal fishing) fishery		17,904	1,828
Medium and large-scale fishery	Purse-seiner	751,212	141,309
	Trawler	122,484	28,310
	Trawler-Purse seiner	182,371	16,310
	Average	<b>369,077</b>	<b>70,146</b>
<b>Overall average</b>		<b>80,612</b>	<b>13,867</b>

Regarding the type of fishery, while the coastal fishermen appear to have the lowest amount of net receipts with YTL 1,828, the purse-seiners appear to have the highest with YTL 141,309, which rises to YTL 253,319 for the purse-seiners more than 30 m in length.

#### 4.3.2.5. Gross profit

Gross profit was calculated by subtracting the variable costs from the gross receipts. It was determined that the gross profit of the fishermen in the Black Sea Region varied from YTL 5,906 to 442,771 by length category and from YTL 6,941 to 252,741 by type of fishery, with an average amount of YTL 28,451 (Table 4.55).

**Table 4.55.** Gross profit by length and type categories (YTL)

Length (m)		Gross receipts	Variable costs	Gross profit
<8		15,035	9,129	5,906
8-12		27,516	18,410	9,106
12-20		76,096	54,087	22,009
20-30		318,175	230,544	87,631
≥30		1,478,192	1,035,421	442,771
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery		19,075	12,152	6,941
Medium and large-scale fishery	Purse-seiner	889,949	637,208	252,741
	Trawler	149,274	101,333	47,941
	Trawler-Purse seiner	198,681	138,464	60,217
	Average	<b>437,467</b>	<b>309,990</b>	<b>127,477</b>
<b>Overall average</b>		<b>93,788</b>	<b>65,337</b>	<b>28,451</b>

#### 4.3.2.6. Fishery income

It was determined that the total fishery income of the fishermen in the Black Sea Region varied from YTL 5,496 to 265,815 by length category and from YTL 6,113 to 148,464 by type of fishery, with an average amount of YTL 18,929 (Table 4.56).



**Table 4.56.** Total fishery income by length and type categories (YTL)

Length (m)	Fishery income					
	Net receipts	Debt interest	Rent	PFL	Total	
<8	1,653	30	0	3,873	5,496	
8-12	1,716	174	0	5,878	7,420	
12-20	11,642	894	0	6,954	17,702	
20-30	44,631	2,171	2,917	13,252	52,795	
≥30	253,319	0	5,200	17,696	265,815	
Type of fishery						
Average of small-scale (Coastal fishing) fishery		1,828	69	0	4,354	6,113
Medium and large-scale fishery	Purse-seiner	141,309	1,929	5,810	14,894	148,464
	Trawler	28,310	785	0	8,882	36,407
	Trawler-Purse seiner	16,310	1,920	0	15,934	30,324
	Average	<b>70,146</b>	<b>1,346</b>	<b>2,218</b>	<b>11,947</b>	<b>78,529</b>
<b>Overall average</b>		<b>13,867</b>	<b>252</b>	<b>396</b>	<b>5,710</b>	<b>18,929</b>

#### 4.3.2.7. Family income

It was determined that the total family income, which is calculated by adding the revenues of fishermen from a non-fishing activity to their fishery income, of the fishermen in the Black Sea Region varied from YTL 5,743 to 266,820 by length category and from YTL 6,375 to 149,107 by type of fishery, with an average amount of YTL 19,229 (Table 4.57).

**Table 4.57.** Total family income by length and type categories (YTL)

Length (m)	Family income			
	Fishery income	Non-fishing income	Total	
<8	5,496	247	5,743	
8-12	7,420	331	7,751	
12-20	17,702	423	18,125	
20-30	52,795	206	53,001	
≥30	265,815	1,005	266,820	
Type of fishery				
Average of small-scale (Coastal fishing) fishery		<b>6,113</b>	<b>262</b>	<b>6,375</b>
Medium and large-scale fishery	Purse-seiner	148,464	643	149,107
	Trawler	36,407	225	36,632
	Trawler-Purse seiner	30,324	1,033	31,357
	Average	<b>78,529</b>	<b>35</b>	<b>78,564</b>
<b>Overall average</b>		<b>18,929</b>	<b>300</b>	<b>19,229</b>

#### 4.3.2.8. Profitability

Table 4.58 gives the financial profitability of the fishermen in the Black Sea Region by length and type categories.

**Table 4.58.** Financial profitability by length and type categories (%)

Length (m)	Net receipts	Debt interests	Equity capital	Financial profitability	Difference (1)(2)	
<8	1,653	30	10,129	16.32	8.54	
8-12	1,716	174	22,993	7.46	-0.32	
12-20	11,642	894	68,658	16.94	9.16	
20-30	44,631	2,171	455,788	9.79	2.01	
≥30	253,319	0	2,840,299	8.92	1.14	
<b>Type of fishery</b>						
Average of small-scale (Coastal fishing) fishery		1,828	69	14,311	12.77	4.99
Medium and large scale fishery	Purse-seiner	141,309	1,929	1,557,396	9.07	1.29
	Trawler	28,310	785	194,026	14.59	6.81
	Trawler-Purse seiner	16,310	1,920	444,089	3.67	-4.11
	Average	<b>70,146</b>	<b>1,346</b>	<b>742,447</b>	<b>9.45</b>	<b>1.67</b>
<b>Overall average</b>		<b>13,867</b>	<b>252</b>	<b>144,231</b>	<b>9.61</b>	1.83

- 1- Difference: Financial profitability – Current interest rate
- 2- Current interest rate has been adjusted to inflation.

As it is indicated in Table 4.58, by length category and type of fishery respectively, the length category of 12-20 m (16.94%), the length category of <8 m (16.32%), and trawlers (14.59%) have the highest percentage of profitability; and the length category of 8-12 m (7.46%), and trawler-purse seiners (3.67%) have the lowest percentage of profitability. A higher amount of income than the current interest rates was earned from the fishing activities in the Black Sea Region, except for the length category of 8-12 m and for trawler-purse seiners.

Table 4.59 gives the economic profitability of the fishermen in the Black Sea Region by length and type categories.

**Table 4.59.** Economic profitability by length and type categories (%)

Length (m)		Net receipts	Total capital	Economic profitability
<8		1,653	11,689	14.14
8-12		1,716	26,501	6.48
12-20		11,642	80,815	14.41
20-30		44,631	515,022	8.67
≥ 30		253,319	3,160,999	8.01
<b>Type of fishery</b>				
Average of small-scale (Coastal fishing) fishery		1,828	16,357	11.18
Medium and large-scale fishery	Purse-seiner	141,309	1,755,539	8.05
	Trawler	28,310	215,270	13.15
	Trawler-Purse seiner	16,310	473,592	3.44
	Average	<b>70,146</b>	<b>831,553</b>	<b>8.44</b>
<b>Overall average</b>		<b>13,867</b>	<b>161,928</b>	<b>8.56</b>

Regarding the length category, while the length category of 12-20 m had the highest percentage of economic profitability (14.41%), the length category of 8-12 m had the lowest (6.48%). Regarding the type of fishery, on the other hand, while trawlers had the highest percentage of economic profitability (13.15%), medium/large-scale trawler-purse seiners had the lowest (3.44%) (Table 4.59).

#### 4.4. Share of species caught in the Black Sea Region in gross receipts

Table 4.60 gives the order of contribution to the gross receipts of the fish species caught by the fishermen in the Black Sea Region.

**Table 4.60.** Order of contribution to the gross receipts of the dominant fish species caught by type of fishery

Fish species	Type of fishery			
	Small-scale (Coastal fishing) fishery	Medium and large-scale fishery		
		Purse-seiner	Trawler	Trawler-Purse seiner
Bonito	1	5	-	2
Whiting	2	-	2	-
Sea snail	3	-	-	-
Grey mullet (Russia)	4	-	-	-
Anchovy	-	1	3	1
Horse mackerel	-	2	-	-
Tuna	-	3	-	-
Striped mullet – Red mullet	5	-	1	-
Sprat	-	-	4	5
Bluefish	-	4	5	3
Striped venus	-	-	-	4

The fish species given in Table 4.60 above have a high economic value for the fishermen in the Black Sea Region. Out of these fish species, red mullet and striped mullet are written together in the table since the fishermen confuse these two species. The significance of a fish species caught for the fishermen depends on the contribution of that species to the gross income rather than its amount, the evaluations have been made according to the value.

The following fish species make the highest contribution to the gross receipts of the fishermen in the Black Sea Region: anchovy, bonito, whiting, sea snail and grey mullet (Russia).

A bulk of the gross receipts in the coastal fishing comes from bonito, whiting and grey mullet (Russia), with a percentage of 51.31%. However, whiting appears to be the most important fish species for the coastal fishing, being exploited throughout the year (Table 4.60).

From the medium and large-scale fishing vessels, purse seiners and trawler-purse seiners fish for similar species (e.g., anchovy). Anchovy accounts for 56.29% and 25.18% of the gross receipts for purse-seiners and trawler-purse seiners, respectively. Anchovy and horse mackerel – schooling pelagic species – account for 75.69% of the gross receipts of purse-seiners. These two species are important for purse-seiners, giving a plentiful amount of catches by surrounding nets. Further, tuna is one of the important fish species purse-seined by large vessels within the quota limits. Tuna is important in another aspect, in that it allows the fishermen to continue fishing in the summer months, in which the bans on fishing are in place.

For trawlers, red mullet and striped mullet – demersal fish species – have significance since those vessels use bottom trawls. 38.47% of the gross receipts of trawlers comes from red mullet, striped mullet and whiting.

**Table 4.61.** Average gross receipts (YTL) from the fish species caught and their share within the total gross receipts (%) by type of fishery

Fish species	Type of fishery							
	Small-scale fishery (Coastal fishing)		Medium and large-scale fishery					
			Purse-seiner		Trawler		Trawler-Purse seiner	
	Share of species within the gross receipts		Share of species within the gross receipts		Share of species within the gross receipts		Share of species within the gross receipts	
YTL	%	YTL	%	YTL	%	YTL	%	
Red mullet - Striped mullet	1,275	6.68	9,788	1.10	29,976	20.08	13,359	6.72
Striped venus	386	2.02	1,642	0.18	5,955	3.99	23,307	11.73
Sprat	-	-	133	0.01	15,196	10.18	21,083	10.61
Sea snail	2,619	13.73	-	-	973	0.65	-	-
Sole - megrim	-	-	-	-	1,721	1.15	-	-
Anglerfish	-	-	-	-	727	0.49	134	0.07
Anchovy	74	0.39	500,956	56.29	19,957	13.37	50,025	25.18
Black scorpion fish	229	1.20	18	0.00	793	0.53	-	-
Horse mackerel + Scad	1,061	5.56	172,639	19.40	4,678	3.13	3,373	1.70
Blotched picarel	29	0.15	60	0.01	43	0.03	-	-
Turbot	908	4.76	739	0.08	11,498	7.70	3,987	2.01
Shrimp	66	0.35	-	-	8,327	5.58	4,552	2.29
Slender goby	2	0.01	-	-	101	0.07	-	-
Shark	15	0.08	-	-	1,103	0.74	767	0.39
Meagre	4	0.02	-	-	658	0.44	-	-
Bluefish	1,276	6.69	40,675	4.57	13,225	8.86	27,888	14.04
Whiting	2,923	15.32	1,911	0.21	27,454	18.39	15,515	7.81
Blue-fin Tuna	-	-	120,437	13.53	-	-	-	-
Bonito	5,092	26.69	37,240	4.18	2,731	1.83	30,954	15.58
Grey mullet (Russia)	1,774	9.30	274	0.03	-	-	359	0.18
Sardine	-	-	1,095	0.12	-	-	58	0.03
Short-body sardinella	413	2.17	27	-	1,231	0.82	306	0.15
Thomback ray	16	0.08	16	-	1,078	0.72	388	0.20
Grey mullet (Turkey)	537	2.82	1,916	0.22	1,848	1.24	1,821	0.92
Gav fish	377	1.98	383	0.04	-	-	805	0.41
<b>Total</b>	<b>19,075</b>	<b>100.00</b>	<b>889,949</b>	<b>100.00</b>	<b>149,274</b>	<b>100.00</b>	<b>198,681</b>	<b>100.00</b>

An estimation of the total volume of catches from the Black Sea fisheries in the period of 2004-2005 is shown in Table 4.62.

When making this estimation, the share of types of fishery within the whole, as well as the shares of fish species within the gross receipts of each type of fishery were taken into consideration.

**Table 4.62.** Estimation of the fish species caught in the Black Sea and of the total catch by type of fishery in the period of 2004-2005 (t)

Fish species	Type of fishery				Total
	Coastal fishing	Medium and large scale fishery			
		Purse-seiner	Trawler	Trawler-Purse seiner	
Red mullet - Striped mullet	698	97	499	788	2,081
Striped venus	0	154	868	46,572	47,594
Sprat	0	13	4,429	18,834	23,276
Sea snail	5,472	0	26	0	5,498
Sole - megrim	0	0	3	0	3
Anglerfish	0	0	4	2	6
Anchovy	4	470,370	2,488	17,465	490,328
Black scorpion fish	54	0	11	0	65
Horse mackerel + Scad	2,339	26,037	291	815	29,482
Blotched picarel	12	1	0	0	13
Turbot	53	0	50	32	135
Shrimp	1	0	61	128	190
Slender goby	0	0	1	0	2
Shark	0	0	92	68	160
Meagre	0	0	1	0	1
Bluefish	661	986	477	2,380	4,504
Whiting	4,574	37	2,355	1,740	8,706
Blue-fin Tuna	0	113	0	0	113
Bonito	8,230	1,939	12	2,971	13,152
Grey mullet (Russia)	2,162	1	0	21	2,184
Sardine	0	2	0	5	7
Short-body sardinella	318	0	46	109	472
Thomback ray	1	0	111	70	182
Grey mullet (Turkey)	345	48	6	130	529
Gav fish	149	4	0	41	194
<b>TOTAL</b>	<b>25,071</b>	<b>499,803</b>	<b>12,022</b>	<b>92,172</b>	<b>629,069</b>

#### 4.5. Views of fishermen on fishery

This section entails the fishermen's views on both today and future of their profession, as well as the problems they face and the ways of solving those problems.

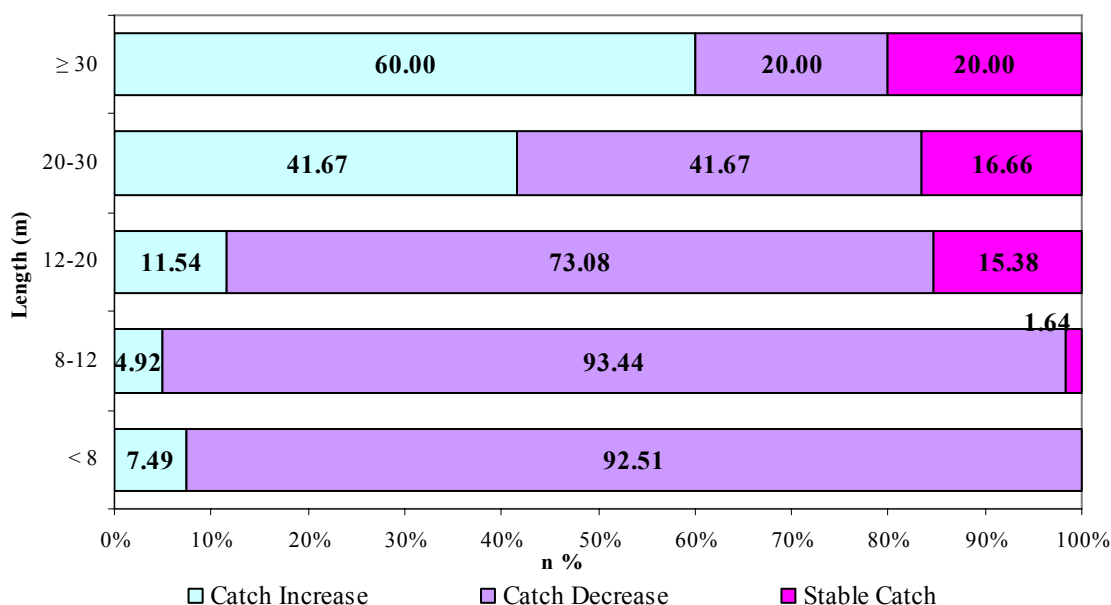
##### 4.5.1. Views of fishermen on catch amount

When asked what the catch amount would be in the future based on the last decade's figures, 84.75% of the fishermen replied that it would decrease, 11.68% replied that it would increase, and 3.57% replied that it would be stable (Table 4.63).

**Table 4.63.** Views of fishermen on the future catch amounts (%)

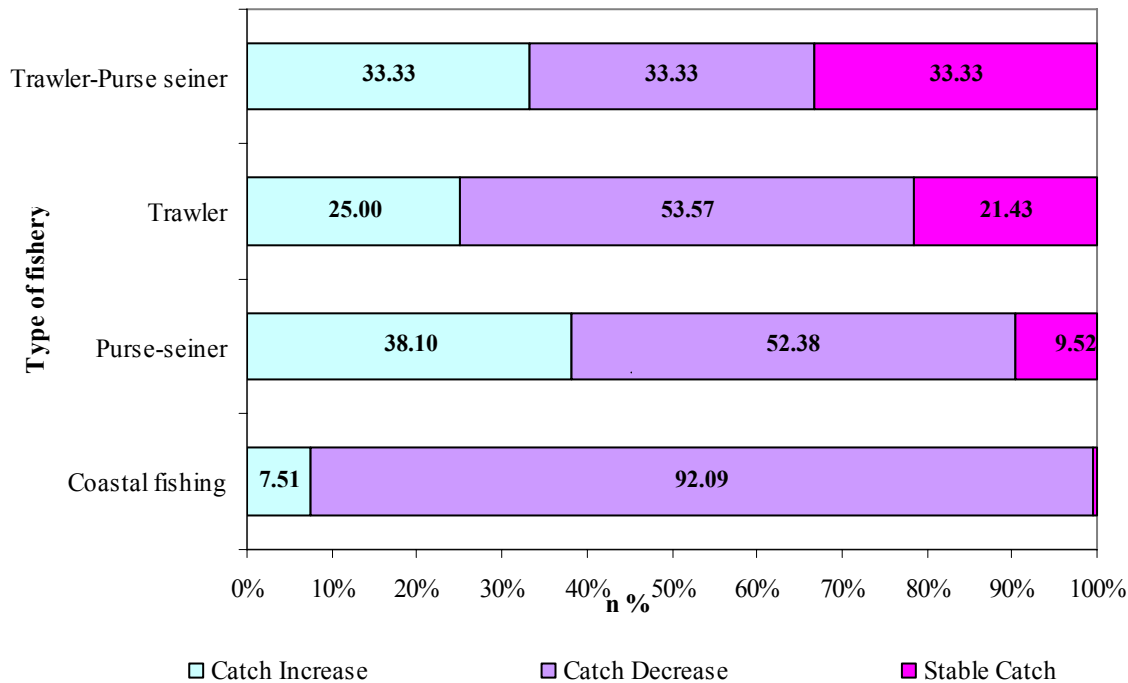
Length (m)	Catch increase	Catch decrease	Stable catch
< 8	4.54	56.17	0.00
8-12	0.98	18.51	0.32
12-20	0.97	6.17	1.30
20-30	3.24	3.25	1.30
≥30	1.95	0.65	0.65
Type of fishery			
Small-scale (Coastal fishing) Fishery Total	<b>6.16</b>	<b>75.66</b>	<b>0.32</b>
Medium and large-scale fishery	Purse-seiner	2.60	3.57
	Trawler	2.27	4.87
	Trawler-Purse seiner	0.65	0.65
	Total	<b>5.52</b>	<b>9.09</b>
<b>Overall total</b>	<b>11.68</b>	<b>84.75</b>	<b>3.57</b>

Regarding the length category, a majority of the owners of the vessels less than 12 m in length replied that the catch amount would decrease. Further, 92.17% of the fishermen from the length category of <8 m and 20% of those from the length category of ≥30 m, in which all the fishing vessels are comprised of purse-seiners, replied that the catches would be in a downward trend. As the vessels grew in length, i.e., the vessels that are more than 20 m in length, fewer number of fishermen talked of a decrease in the catch amount (Figure 4.26).



**Figure 4.26.** Catch estimations by length category (%)

Regarding the type of fishery, most of the coastal fishermen expect a decrease in the catch amount (92.09%). As for the medium and large-scale fishermen, the percentage of those who expect a decrease in the catch amount varies from 33.33% to 53.57% (Figure 4.27).



**Figure 4.27.** Catch estimations by type of fishery (%)

Competition appears to be the cause of the higher percentage of coastal fishermen waiting for a decrease in the catch amount when compared to the medium and large-scale fishermen. Purse-seiners, trawlers, trawler-purse seiners are larger and have better operating mechanisms than the coastal fishing vessels. Therefore, those vessels catch more fish than the coastal fishing vessels. As catch amounts increase, prices of fish fall, which is the fact that removes the ability of coastal fishermen to compete since they catch small amounts of fish. These make clear why such a high percentage of coastal fishermen expect a decrease in the catch amount.

In a question directed to those fishermen who wait for a decrease in the catch amount, it was asked what the reasons of the decrease would be. Table 4.64 gives the answers of those fishermen.

As it is indicated in Table 4.64, the fishermen thought that the pollution of the sea was the main factor of decrease in the catch amount.

Further, the coastal fishermen stated that the long range sonars, in particular, drive the fish away and they cause all the fish of a fishing zone to be caught, which leads to an over-fishing by the purse-seiners. They also stated that both lift nets and bottom trawls make harm to fish spawning areas and cause the catch amount to decrease.



It was told the fishermen that the decrease in the catch amount was the result of over-fishing for the most part and thus the amount of catches from the Black Sea fisheries was in decline. After that, when asked what could be done to prevent the decrease, 24.09% replied that a catch quota should be in place, 23.79% replied that vessel size should be limited, and 14.30% replied that a catch quota should be imposed for a single cruise. Further, 8.95% of the fishermen stated in reply to that question that the number of fishermen should be reduced and 8.74% stated that the fishing should be prohibited in some areas (Table 4.65).

Owners of purse-seiners also show favour to a catch quota. What lay behind this is the increase against the other fishing vessels of catch amount by the purse-seiners that are more than 30 m in length, which have recently increased their fishing power by enlarging their vessels to bigger sizes, installing long range sonars on board their vessels and increasing their engine power, and by those purse-seiners, which form fleets to fish and are usually operated by brothers.

**Table 4.64.** Reasons of the reduction expectation in catch amounts by length and type categories (%)

	Length (m)					Type of fishery					Total
	< 8	8-12	12-20	20-30	≥30	Small-scale fishery (Coastal fishing)	Medium and large scale fishery			Total	
							Purse-seiner	Trawler	Trawler-Purse seiner		
Pollution of the sea	12.70	4.43	1.26	0.55	0.12	<b>17.21</b>	0.89	0.72	0.24	<b>1.85</b>	<b>19.06</b>
Climate change	1.65	0.27	0.22	0.17	-	<b>1.91</b>	0.07	0.26	0.07	<b>0.40</b>	<b>2.31</b>
Coastal Road and other constructions	2.97	1.59	0.38	0.07	0.12	<b>4.56</b>	0.44	0.07	0.05	<b>0.56</b>	<b>5.13</b>
Violation of catch bans	12.10	3.79	1.35	0.53	0.14	<b>16.14</b>	0.72	0.85	0.21	<b>1.78</b>	<b>17.91</b>
High number of fishing vessels	8.41	2.89	0.84	0.77	-	<b>11.30</b>	0.75	0.74	0.12	<b>1.61</b>	<b>12.91</b>
Sonar	10.22	3.49	1.52	0.36	-	<b>14.24</b>	0.46	0.65	0.24	<b>1.35</b>	<b>15.59</b>
Small mesh size	0.56	0.06	-	-	-	<b>0.62</b>	-	-	-	-	<b>0.62</b>
Big and deep fishing nets	1.73	0.75	0.24	-	0.14	<b>2.62</b>	0.24	-	-	<b>0.24</b>	<b>2.85</b>
Trawls	4.89	1.50	0.51	0.21	-	<b>6.50</b>	-	0.62	-	<b>0.62</b>	<b>7.11</b>
Lift net	1.37	1.04	-	0.07	-	<b>2.41</b>	-	0.07	-	<b>0.07</b>	<b>2.48</b>
Over-fishing	2.82	0.46	0.03	0.21	0.10	<b>3.28</b>	0.31	0.03	-	<b>0.34</b>	<b>3.62</b>
Non-observance of fishing rules	2.02	0.67	0.39	-	-	<b>2.79</b>	-	0.29	-	<b>0.29</b>	<b>3.08</b>
Purse-seiner	2.15	0.38	0.34	0.05	-	<b>2.53</b>	-	0.39	-	<b>0.39</b>	<b>2.92</b>
High number of dolphins	1.95	0.63	0.24	0.29	-	<b>2.58</b>	0.29	0.24	-	<b>0.53</b>	<b>3.11</b>
Light fishing	0.15	-	-	-	-	<b>0.15</b>	-	-	-	-	<b>0.15</b>
Light sources on the costs	0.39	-	0.14	-	0.07	<b>0.39</b>	0.21	-	-	<b>0.21</b>	<b>0.60</b>
Fertilisers poured into streams	0.26	-	-	-	-	<b>0.26</b>	-	-	-	-	<b>0.26</b>
Other*	0.20	-	-	-	0.09	<b>0.21</b>	0.09	-	-	<b>0.09</b>	<b>0.29</b>

\* : Noise of ships, use of trawls and purse-seiners for fishing small species, construction of dams on the rivers

**Table 4.65.** Requirements for catch quota by length and type categories (%)

	Length (m)					Type of fishery				Total	
	< 8	8–12	12-20	20-30	≥30	Small-scale fishery (Coastal fishing)	Medium and large scale fishery				
							Purse-seiner	Trawler	Trawler-Purse seiner		Total
Limit the fishing period	6.37	0.4	0.19	-	-	<b>6.42</b>	0.35	0.19	-	<b>0.54</b>	<b>6.96</b>
Reduce the number of fishermen	7.39	0.51	0.73	0.32	-	<b>8.01</b>	0.48	0.46	-	<b>0.94</b>	<b>8.95</b>
Impose a catch quota for a single cruise	11.8	1.51	0.99	-	-	<b>13.31</b>	0.99	-	-	<b>0.99</b>	<b>14.30</b>
Limit the vessel size	16.87	4.14	1.94	0.65	0.19	<b>22.09</b>	0.46	1.05	0.19	<b>1.70</b>	<b>23.79</b>
Prohibit fishing in some areas	6.18	1.59	0.81	-	0.16	<b>8.36</b>	0.11	0.11	0.16	<b>0.38</b>	<b>8.74</b>
Impose quota	18.2	4.25	1.13	0.51	-	<b>22.10</b>	1.13	0.86	-	<b>1.99</b>	<b>24.09</b>
Limit the fishing nets	4.62	1.08	0.67	0.67	-	<b>5.56</b>	0.67	0.81	-	<b>1.48</b>	<b>7.04</b>
Other	2.42	1.77	1.40	0.54	-	<b>4.89</b>	0.35	0.89	-	<b>1.24</b>	<b>6.13</b>

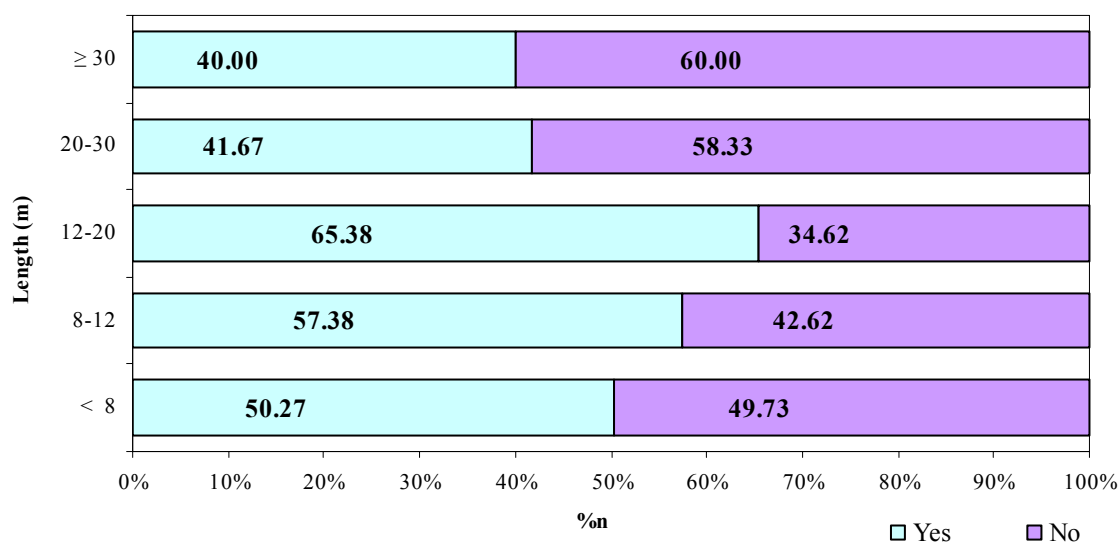
#### 4.5.2. Views of fishermen on stopping fishing activities

When asked whether or not they would stop fishing activities, provided that they sell their vessels at market prices, 51.95% of the Black Sea fishermen agreed to stop fishing activities (Table 4.66).

**Table 4.66.** Fishermen who agree/disagree to stop fishing activities, provided that they sell their vessels at market prices (%)

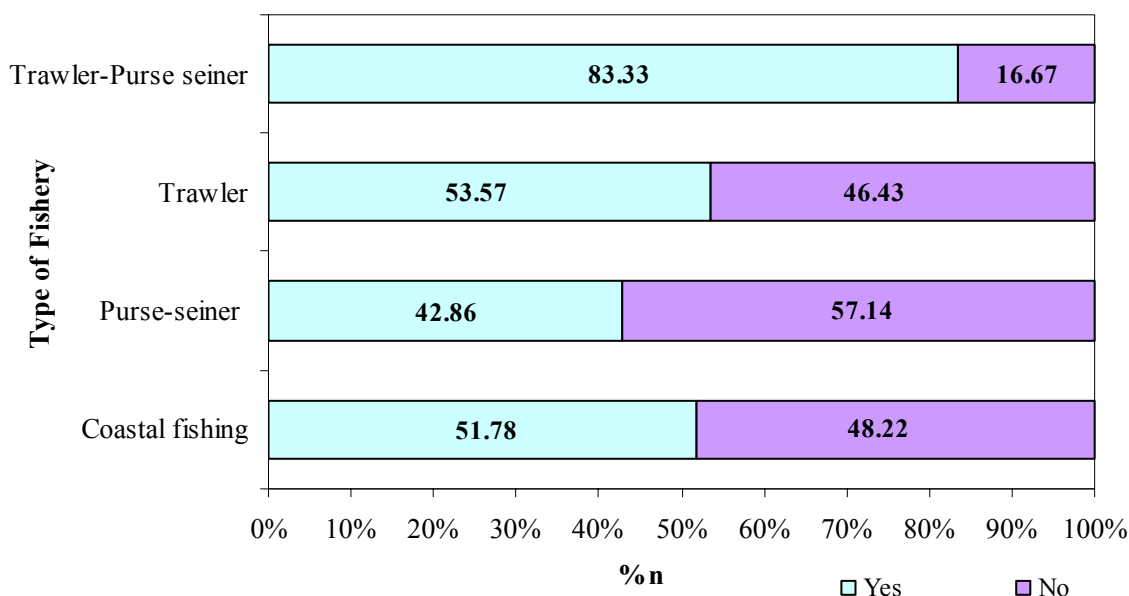
Length (m)		Yes	No	Total
< 8		30.52	30.19	60.71
8-12		11.36	8.44	19.81
12-20		5.53	2.92	8.44
20-30		3.24	4.55	7.79
≥30		1.30	1.95	3.25
Type of fishery				
Small-scale (Coastal fishing) Fishery Total		<b>42.53</b>	<b>39.61</b>	<b>82.14</b>
Medium and large scale fishery	Purse-seiner	2.92	3.90	6.82
	Trawler	4.87	4.22	9.09
	Trawler-Purse seiner	1.63	0.32	1.95
	Total	<b>9.42</b>	<b>8.44</b>	<b>17.86</b>
<b>Overall total</b>		<b>51.95</b>	<b>48.05</b>	<b>100.00</b>

Regarding the length category, the length category of 12-20 m has the highest percentage of fishermen who agree to stop fishing activities. (Figure 4.28)



**Figure 4.28.** Fishermen who agree/disagree to stop fishing activities, provided that they sell their vessels at market prices, by length category (%)

Regarding the type of fishery, on the other hand, the trawler-purse seiner group has the highest percentage (83.33%). Further, 53.57% of the trawler fishermen and 51.78% of the coastal fishermen agreed to stop fishing activities. However, the purse-seiner group has the least percentage – 42.86% - of fishermen who agree to stop fishing activities (Figure 4.29).



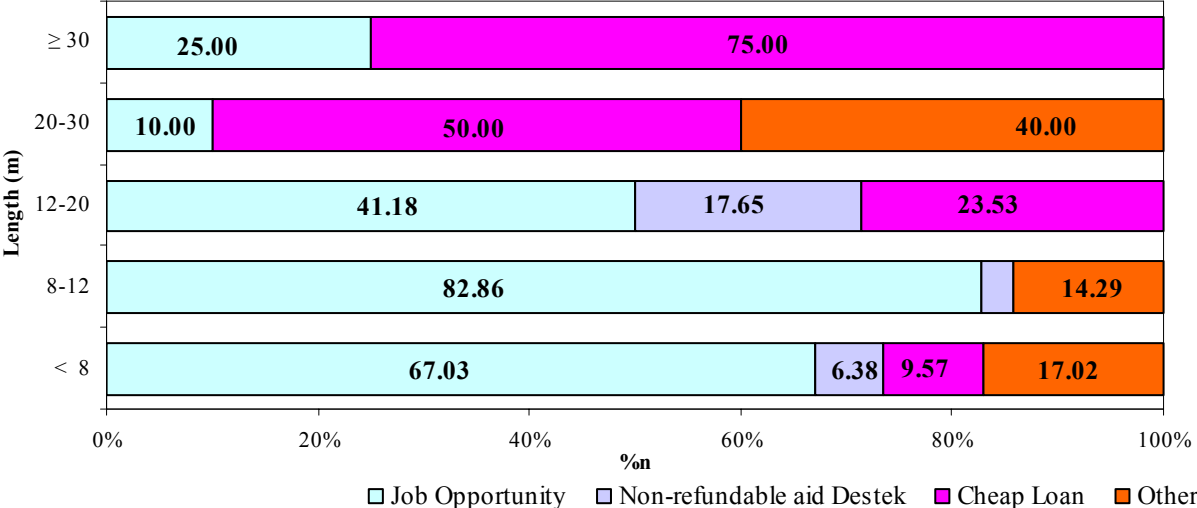
**Figure 4.29.** Fishermen who agree/disagree to stop fishing activities, provided that they sell their vessels at market prices, by type of fishery

A question was directed to those fishermen who agree to stop fishing activities, provided that they sell their vessels at market prices. When asked what types of support they requested to establish a new business, 63.13% of those fishermen requested to be placed in a job. Besides, a majority of fishermen requested to be supported through cheap loans to establish a new business (Table 4.68).

**Table 4.67.** Support types demanded by the fishermen who agree to stop fishing activities (%)

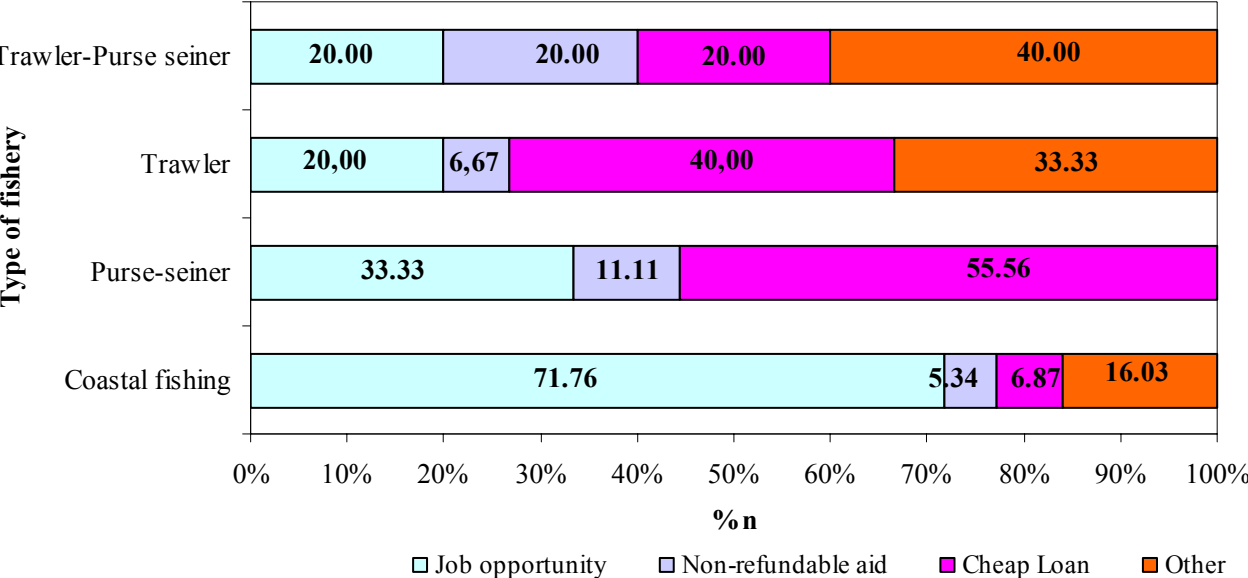
Length (m)	Job	Non-refundable aid	Cheap Loan	Other
< 8	39.38	3.75	5.63	10.00
8-12	18.13	0.63	-	3.13
12-20	4.38	1.88	2.50	-
20-30	0.63	-	3.13	2.50
≥30	0.63	-	1.88	-
Type of fishery				
Small-scale (Coastal fishing) Fishery Total	<b>58.75</b>	<b>4.38</b>	<b>5.63</b>	<b>13.13</b>
Medium and large scale fishery	Purse-seiner	1.88	0.63	3.13
	Trawler	1.88	0.63	3.75
	Trawler-Purse seiner	0.63	0.63	0.63
	Total	<b>4.38</b>	<b>1.88</b>	<b>7.50</b>
<b>Overall total</b>	<b>63.13</b>	<b>6.25</b>	<b>13.13</b>	<b>17.50</b>

Creation of job opportunities was the most requested type of support. What lay behind this was that 71.76% of coastal fishermen agreed to stop fishing activities (Figure 4.31). Those coastal fishermen who agree to stop fishing activities account for 58.75% of all fishermen.



**Figure 4.30.** Demands of the fishermen who agree to stop fishing activities by length category

As for the medium and large-scale fishermen, only 24.14% of them agreed to stop fishing activities. A majority of the medium and large-scale fishermen (41.38%) requested to be supported through cheap loans to establish a new business (Additional Table 23).



**Figure 4.31.** Support types demanded by the fishermen who agree to stop fishing activities by type of fishery

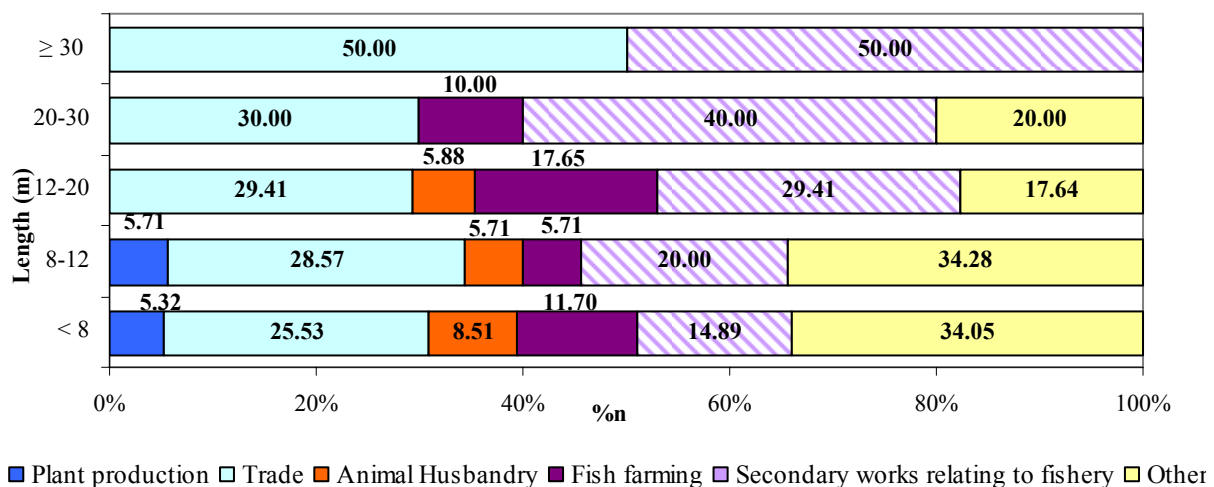
When asked in which area they would use a non-refundable aid or a cheap loan, 27.50% of fishermen replied that they would use it for trading purposes and 20.00% for secondary works relating to fishery (Table 4.68).

**Table 4.68.** Work areas for which the fishermen seek support by length and type categories (%)

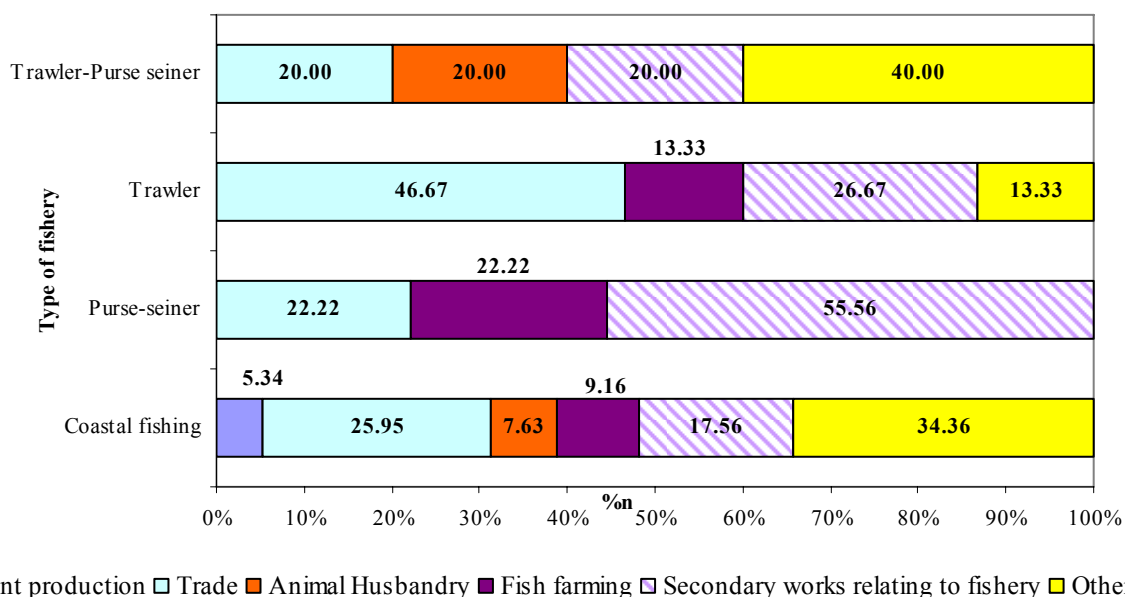
Length (m)		Plant production	Trade	Animal husbandry	Fish Farming	Secondary works relating to fishery*	Other	Rate of affirmative decisions (%)
< 8		3.13	15.00	5.00	6.88	8.75	20	58.75
8-12		1.25	6.25	1.25	1.25	4.38	7.51	21.88
12-20		-	3.13	0.63	1.88	3.13	1.88	10.63
20-30		-	1.88	-	0.63	2.50	1.25	6.25
≥30		-	1.25	-	-	1.25	-	2.50
Type of fishery								
Small-scale (Coastal fishing) Fishery Total		4.38	21.25	6.25	7.50	14.38	28.13	81.88
Medium and large scale fishery	Purse-seiner	-	1.25	-	1.25	3.13	-	5.63
	Trawler	-	4.38	-	1.25	2.50	1.26	9.38
	Trawler-Purse seiner	-	0.63	0.63	-	0.63	1.25	3.13
	Total	-	6.25	0.63	2.50	6.25	2.51	18.13
<b>Overall total</b>		<b>4.38</b>	<b>27.50</b>	<b>6.88</b>	<b>10.63</b>	<b>20.00</b>	<b>30.63</b>	<b>100.00</b>

\* ice production, selling of fishing gear, etc.

Regarding the length category, the length category of ≥30 m, in which all the fishing vessels are comprised of purse-seiners, has the highest percentage of fishermen who seek support for trading purposes when they stop fishing activities. As the vessels become smaller in length, the rate of the fishermen who wish to engage in trade decreases and the number of options preferred increases (Figure 4.32). Regarding the type of fishery, a majority of the medium and large-scale fishermen prefer to engage in trade (Figure 4.33).



**Figure 4.32.** Future plans of the fishermen who are stopping fishing activities by length category



**Figure 4.33.** Future plans of the fishermen who are stopping fishing activities by type of fishery

#### 4.5.3. Views of fishermen on new investments

17.53% of fishermen stated that they used credit when purchasing their vessels. The rate of loan use decreases to 9.41% among the coastal fishermen. This is generally not because of the low rate of loan use among those fishermen, but because of the low level of the capital required for coastal fishing. As the vessels grow in length, the rate of loan use among fishermen increases. However, the situation is different when the length category of  $\geq 30$  is the case. Regarding the type of fishery, the rate of loan use when purchasing vessel is higher for purse-seiners when compared to trawlers and trawler-purse seiners (Table 4.69).

50.32% of fishermen stated that they would use loan if provided with suitable loan facilities. It is considered that the fact that the rate of fishermen who do not want to use credit is so high when compared to those who currently use credit is one of the results of the economic crisis of 2001. The fishermen said that they did not want to use credit when purchasing their vessels since the outcomes of the economic crisis of 2001 were so heavy for them.

12.34% of the fishermen in the Black Sea Region stated that they exercised their right to increase the capacity of their vessels, i.e., the right to a 20 percent capacity increase. Generally, the medium and large-scale fishermen (owners of purse-seiners) were found out to have exercised the right to enlarge vessels.

It was observed that where appropriate credit conditions occurred, the fishermen in the Black Sea region would show favour to a capacity increase in the fishing fleet or to the modernisation of the old vessels.



**Table 4.69.** Views of the fishermen on the new investments by length and type categories (%)

Length (m)	Loan use during the purchase of the vessel		Investment in the vessel if provided with suitable credit facilities		Exercise of the right to have a larger vessel in length		
	Yes	No	Yes	No	Yes	No	
< 8	5.85	54.86	24.34	36.37	4.22	56.49	
8-12	3.57	16.24	11.37	8.44	1.62	18.19	
12-20	3.25	5.19	5.52	2.92	1.95	6.49	
20-30	3.88	3.91	6.49	1.30	3.25	4.54	
≥30	0.98	2.27	2.60	0.65	1.30	1.95	
<b>Type of fishery</b>							
Small-scale (Coastal fishing) Fishery Total		<b>9.41</b>	<b>72.73</b>	<b>37.01</b>	<b>45.13</b>	<b>6.5</b>	<b>75.64</b>
Medium and large scale fishery	Purse-seiner	2.27	4.55	5.20	1.62	2.27	4.55
	Trawler	4.55	4.54	6.49	2.60	2.92	6.17
	Trawler-Purse seiner	1.30	0.65	1.62	0.33	0.65	1.30
	Total	<b>8.12</b>	<b>9.74</b>	<b>13.31</b>	<b>4.55</b>	<b>5.84</b>	<b>12.02</b>
<b>Overall total</b>		<b>17.53</b>	<b>82.47</b>	<b>50.32</b>	<b>49.68</b>	<b>12.34</b>	<b>87.66</b>

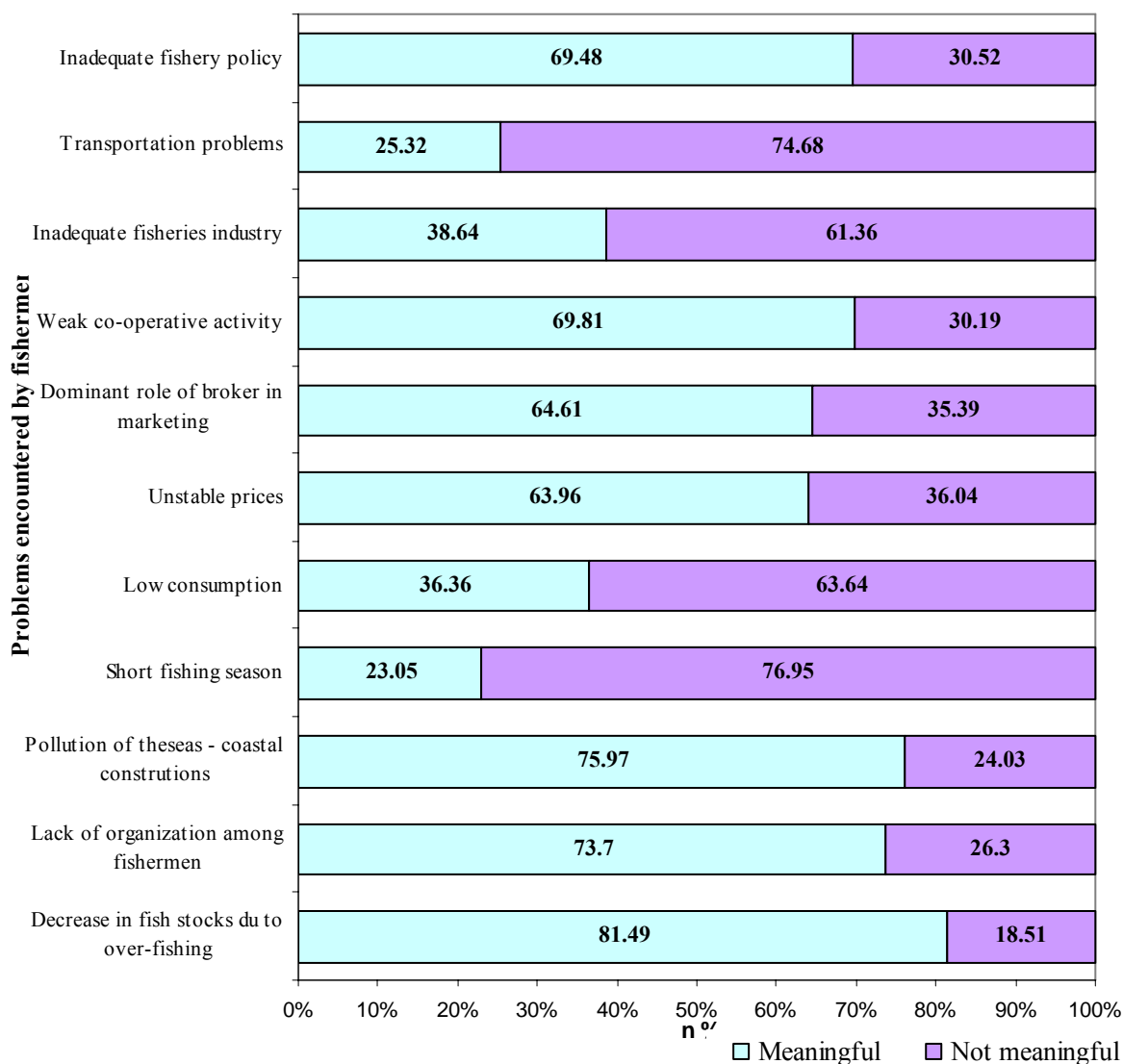
#### 4.5.4. Problems and views of fishermen concerning the sector

According to the fishermen in the Black Sea region, the fisheries sector has so many problems varying from over-fishing to inadequate fishery policies (Table 4.70).

**Table 4.70.** Problems the fishermen consider meaningful in the fishery sector (5)

Problems of the fisheries sector	Meaningful	Not meaningful
Decrease in the fish stocks due to over-fishing	81.49	18.51
Pollution of the seas and the coastal constructions	75.97	24.03
Inadequate organisation	73.70	26.30
Weak co-operative activity	69.81	30.19
Inadequate fishery policy	69.48	30.52
Roles of brokers in marketing	64.61	35.39
Unstable prices	63.96	36.04
Inadequate fisheries industry	38.64	61.36
Low consumption	36.36	63.64
Transportation problems	25.32	74.68
Short fishing period	23.05	76.95

When asked which problems in the fisheries sector were important for them, the fishermen replied that the reduction of fish stocks due to over-fishing was the most important problem of the sector. Among the other important problems of the sector stated by the fishermen were the pollution of the sea, coastal constructions due to coastal road, inadequate organisation and ineffectiveness of co-operatives (Figure 4.34).



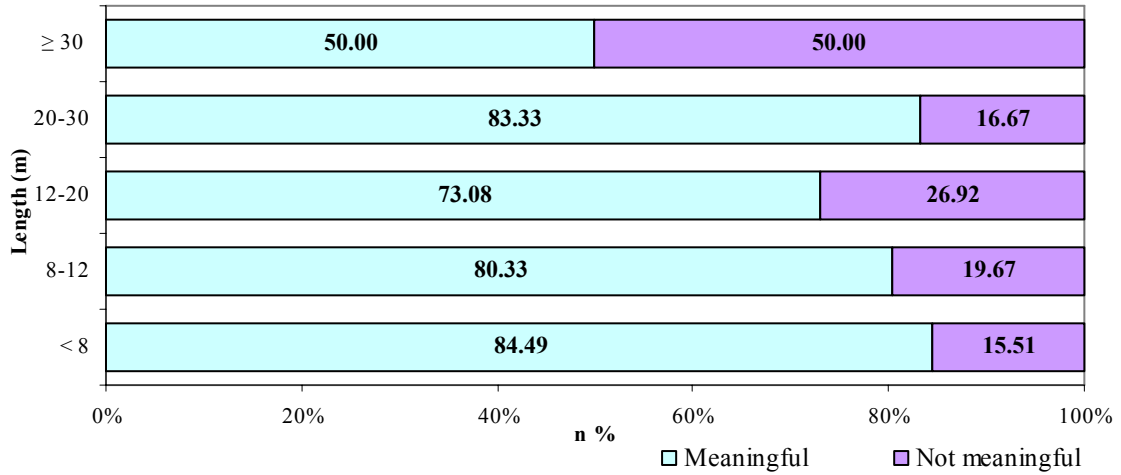
**Figure 4.34.** Problems faced by fishermen in the fisheries sector

Some fishermen reported that fishing period was long enough while it was longer than the required period according to some other. In addition, the low rate of per capita fish consumption, lack of a fish industry, short fishing period and transportation problems were other important problems reported by the fishermen.

When asked whether or not campaigns for the promotion and diversification of fish consumption as in the nut sector would be useful, the fishermen replied that it would not. 63.64% of fishermen think that the fish consumption is at a normal level or does not pose a problem.

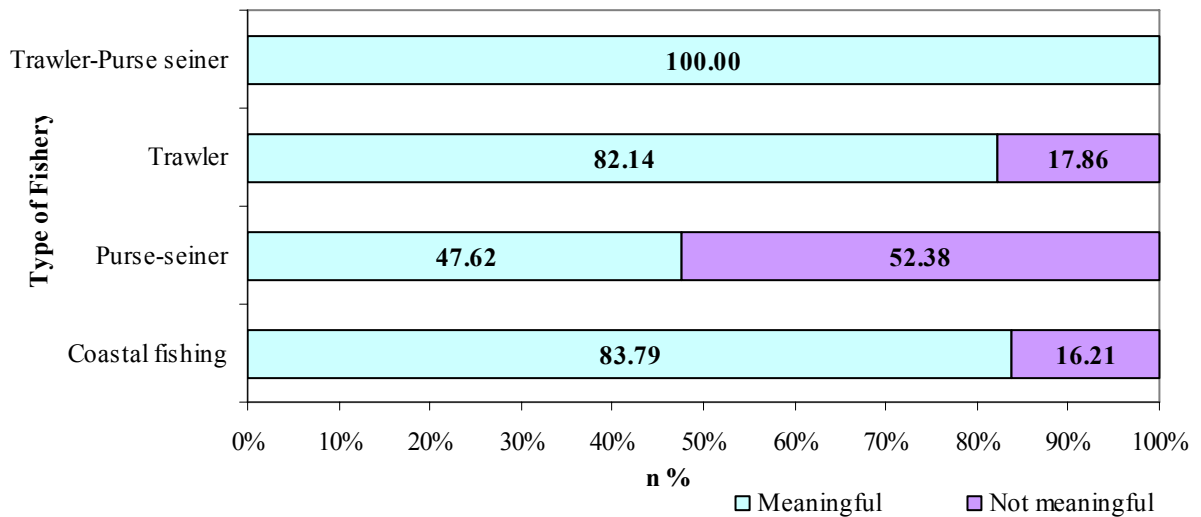
62.34% of fishermen hold membership in fisheries co-operatives. However, most of those fishermen explained that the co-operatives were not effective and that ineffectiveness created a problem in the sector. The above-mentioned explanations of the fishermen suggested that establishment of fisheries co-operatives was a statutory one without being adopted by the fishermen.

Regarding the length category, all the fishermen (82.55%) saw over-fishing as the most important problem, except those from the length category of  $\geq 30$ . 50% of the fishermen from the said category saw over-fishing as the most important problem. (Figure 4.35).



**Figure 4.35.** Breakdown of the fishermen who consider/do not consider meaningful a reduction in the catch by length category

Regarding the type of fishery, while 83.79%, 82.14%, 100.00% of coastal fishermen, trawler fishermen and trawler-purse seiner fishermen consider meaningful the reduction of fish stocks due to over-fishing, such reduction is considered meaningful by 47.62% of purse-seiner fishermen (Figure 4.36).



**Figure 4.36.** Breakdown of the fishermen who consider/do not consider meaningful a reduction in the catch by type of fishery

#### **4.5.5. Recommendations on the solutions for the current problems of fishermen**

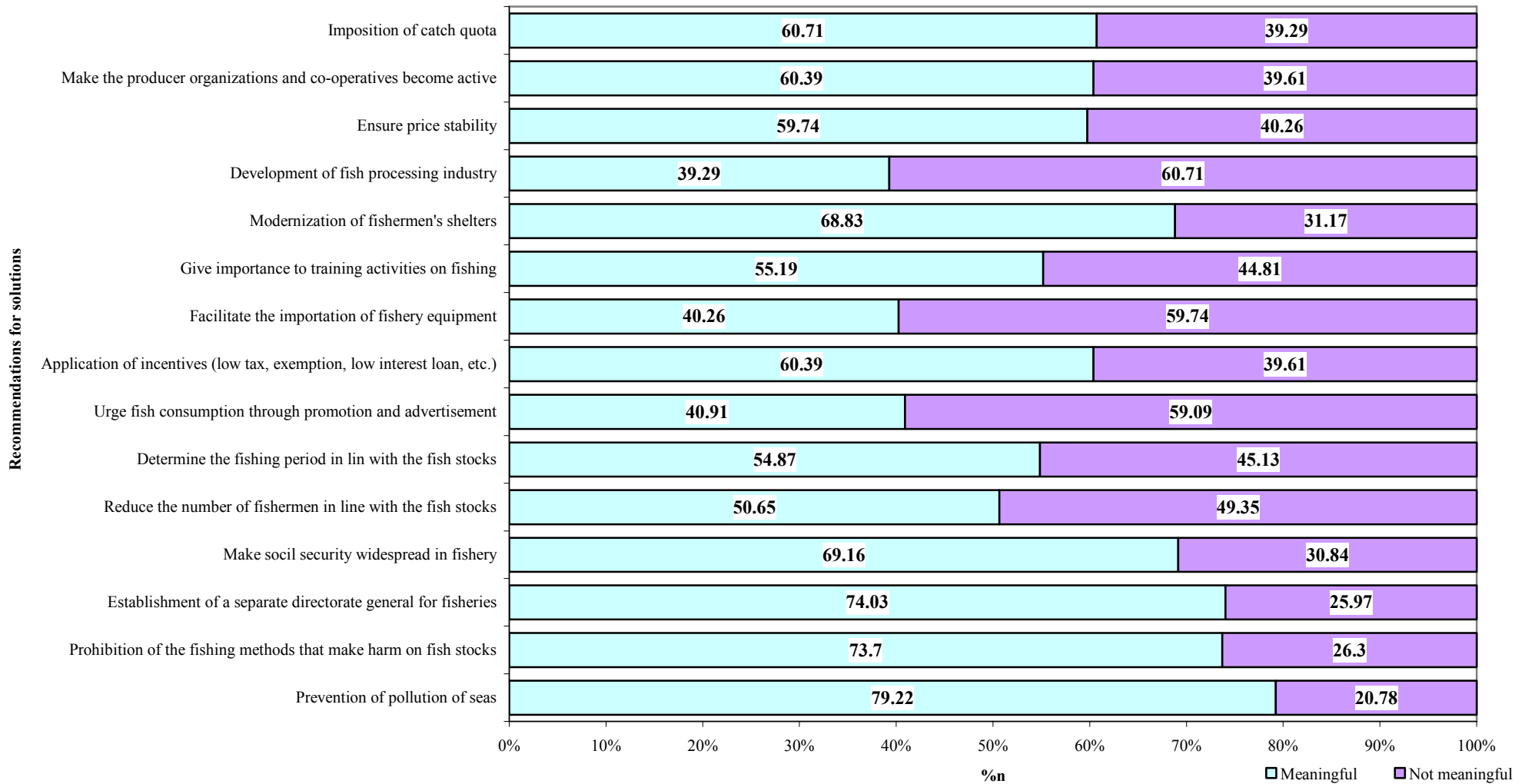
When asked what the recommendations they might make on the solution of the current problems, 79.22% of fishermen replied that the pollution of the sea should be prevented, 74.03% replied that a Directorate General of Fisheries or a separate Ministry should be established, 73.70% replied that the fishing methods that make harm to the fish stocks should be prohibited (Table 4.71).

**Table 4.71.** Order of importance of the future regulations requested by the fishermen by length category (%)

Future regulations in the fisheries sector	Length (m)											
	<8		8-12		12-20		20-30		≥30		Overall average	
	Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful
Prevention of the pollution of the seas	49.35	11.36	14.29	5.52	7.47	0.97	6.17	1.62	1.95	1.30	79.22	20.78
Prohibition of the fishing methods that make harm on the fish stocks	44.81	15.91	15.26	4.55	5.84	2.60	5.84	1.95	1.95	1.30	73.70	26.30
Establishment of a separate directorate general for fisheries	44.48	16.23	14.61	5.19	6.17	2.27	6.17	1.62	2.60	0.65	74.03	25.97
Make the social security widespread in fishery	41.56	19.16	14.61	5.19	5.84	2.60	4.87	2.92	2.27	0.97	69.16	30.84
Reduce the number of fishermen in line with the fish stocks	28.90	31.82	10.39	9.42	4.87	3.57	4.87	2.92	1.62	1.62	50.65	49.35
Determine the fishing period in line with the fish stocks	34.42	26.30	12.34	7.47	4.87	3.57	2.27	5.52	0.97	2.27	54.87	45.13
Urge fish consumption through promotion and advertisement	22.73	37.99	7.79	12.01	4.55	3.90	4.22	3.57	1.62	1.62	40.91	59.09
Incentives (low tax, exemption, low interest loan, etc.)	33.44	27.27	13.64	6.17	6.17	2.27	5.19	2.60	1.95	1.30	60.39	39.61
Facilitate the importation of fishery equipment	20.13	40.58	9.42	10.39	5.84	2.60	3.57	4.22	1.30	1.95	40.26	59.74
Give importance to the training on fishing	31.82	28.90	11.36	8.44	5.19	3.25	5.19	2.60	1.62	1.62	55.19	44.81
Modernisation of shelters, ports and slips	41.23	19.48	14.61	5.19	5.19	3.25	5.52	2.27	2.27	0.97	68.83	31.17
Development of fish processing industry	20.78	39.94	8.44	11.36	4.55	3.90	3.25	4.55	2.27	0.97	39.29	60.71
Ensure price stability	33.12	27.60	12.66	7.14	5.52	2.92	6.17	1.62	2.27	0.97	59.74	40.26
Make the producer organisations and co-operatives become active	34.74	25.97	12.99	6.82	5.84	2.60	5.19	2.60	1.62	1.62	60.39	39.61
Imposition of catch quota	36.36	24.35	12.66	7.14	5.52	2.92	3.90	3.90	2.27	0.97	60.71	39.29

**Table 4.72.** Order of importance of the future regulations requested by the fishermen by type of fishery (%)

Future regulations in the fisheries sector	Type of fishery											
	Average of small-scale (Coastal fishing) fishery		Medium and large-scale fishery						Average of Medium and large scale fishery		Overall average	
	Meaningful	Not meaningful	Purse-seiner		Trawler		Trawler-Purse seiner					
			Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful	Meaningful	Not meaningful		
Prevention of the pollution of the seas	65.26	16.88	4.87	1.95	7.14	1.95	1.95	0.00	13.96	3.90	79.22	20.78
Prohibition of the fishing methods that make harm on the fish stocks	61.36	20.78	4.22	2.60	6.49	2.60	1.62	0.32	12.34	5.52	73.70	26.30
Establishment of a separate directorate general for fisheries	60.71	21.43	5.52	1.30	6.49	2.60	1.30	0.65	13.31	4.55	74.03	25.97
Make the social security widespread in fishery	57.47	24.68	4.55	2.27	5.52	3.57	1.30	0.65	11.36	6.49	68.83	31.17
Reduce the number of fishermen in line with the fish stocks	40.58	41.56	3.90	2.92	5.19	3.90	0.97	0.97	10.06	7.79	50.65	49.35
Determine the fishing period in line with the fish stocks	48.05	34.09	3.25	3.57	3.25	5.84	0.32	1.62	6.82	11.04	54.87	45.13
Urge fish consumption through promotion and advertisement	31.17	50.97	2.60	4.22	6.17	2.92	0.97	0.97	9.74	8.12	40.91	59.09
Incentives (low tax, exemption, low interest loan, etc.)	48.70	33.44	4.87	1.95	5.52	3.57	1.30	0.65	11.69	6.17	60.39	39.61
Facilitate the importation of fishery equipment	30.52	51.62	3.57	3.25	4.87	4.22	0.97	0.97	9.42	8.44	39.94	60.06
Give importance to the training on fishing	44.81	37.34	2.92	3.90	6.17	2.92	1.30	0.65	10.39	7.47	55.19	44.81
Modernisation of shelters, ports and slips	57.14	25.00	4.22	2.60	6.49	2.60	0.97	0.97	11.69	6.17	68.83	31.17
Development of fish processing industry	30.19	51.95	3.90	2.92	4.22	4.87	0.97	0.97	9.09	8.77	39.29	60.71
Ensure price stability	47.08	35.06	4.55	2.27	6.82	2.27	1.30	0.65	12.66	5.19	59.74	40.26
Make the producer organisations and co-operatives become active	49.03	33.12	4.87	1.95	5.52	3.57	1.30	0.65	11.69	6.17	60.71	39.29
Imposition of catch quota	49.68	32.47	4.55	2.27	5.19	3.90	0.97	0.97	10.71	7.14	60.39	39.61



**Figure 4.37.** Recommendations on the solutions of the problems in fisheries sector (%)

#### 4.6. Average fuel consumption of fishermen and the effect of Excise Tax relief

It was found out that while 34.09% of the fishermen in the Black Sea were subject to Excise Tax relief in fuel consumption, 65.91% of them were not. It was concluded that the application/non-application to fishermen of Excise Tax relief in fuel consumption was related to the type of fishery (Table 4.73).

**Table 4.73.** Average fuel costs (YTL) of fishermen and the rate of the fishermen who are subject to or not subject to Excise Tax relief (%)

Length (m)	Fuel Excise Tax relief				
	Fishermen who are subject to		Fishermen who are not subject to		
	%	Average expense	%	Average expense	
< 8	7.49	2,250	92.51	1,351	
8-12	52.46	2,812	47.54	2,731	
12-20	96.15	9,150	3.85	250	
20-30	100.00	37,977	-	-	
≥30	100.00	174,150	-	-	
Type of fishery					
Small-scale (Coastal fishing) Fishery Total		<b>20.16</b>	<b>3,593</b>	<b>79.84</b>	<b>1,549</b>
Medium and large-scale fishery	Purse-seiner	100.00	101,526	4.76	250
	Trawler	100.00	22,321	-	-
	Trawler-Purse seiner	100.00	27,408	-	-
	Total	<b>98.18</b>	<b>53,118</b>	<b>1.82</b>	<b>95</b>
<b>Overall total</b>		<b>34.09</b>	<b>16,597</b>	<b>65.91</b>	<b>1,543</b>

##### 4.6.1. Coastal fishing (Small-scale fishery)

It was determined that while 20.16% of coastal fishermen were subject to Excise Tax relief in fuel consumption, 79.84% were not, which is considerably a high rate. In a year, coastal fishermen spent YTL 1.961 in average on fuel. The annual average fuel cost was YTL 3,593 for the fishermen who were subject to Excise Tax relief and YTL 1,549 for those who were not subject to Excise Tax relief.

Coastal fishermen reported that they spent around YTL 700 as transaction charge including registration, recording, transportation, notary public and VAT when they filed an application for being subject to Excise Tax relief. It might be considered that since the coastal fishermen would spend as much as the amount they would benefit from Excise Tax relief when they consumed around 700 l. of fuel the rate of the coastal fishermen who filed an application for being subject to Excise Tax relief remained at a low level (20.16%).

Among the coastal fishermen, a 700 l. fuel consumption amount might be the case for those using lift nets or diver's equipment, as well as for the vessels mainly fishing for pelagic species like bonito. The aforesaid coastal fishing vessels mostly consist of those vessels that are 8-12 m in length. 52.46% of the fishermen from the length category of 8-12 m were subject to Excise Tax relief in fuel consumption. However, the fishing vessels that are 8-12 m in length account for 19.81% and 24.11% of all the vessels and the coastal fishing vessels, respectively. Since the owners of the vessels that are less than 8 m in length would spend as much as the amount they would benefit from Excise Tax relief in fuel consumption, only a limited number of those fishermen filed an application for being subject to Excise Tax relief (7.49%). Besides, the above-mentioned length category comprises the retired persons, as well



as those who have a vessel due to geographical reasons, i.e., dependency on the sea, and who give lesser importance to commercial fishing.

#### **4.6.2. Medium and large-scale fishermen**

All of the purse-seiners, trawlers and trawler-purse seiners that are used for medium and large-scale fishing activities are subject to Excise Tax relief in fuel consumption (Table 4.73).

Regarding the medium and large-scale fishermen, what is important to take into consideration is not their being subject/not subject to Excise Tax relief in fuel consumption, but whether or not they tend to increase their fishing effort as a result of decrease in fuel cost with the Excise Tax relief. It was observed that the purse-seiner fishermen made contradictory statements regarding that issue. Some stated that they had to fish and they would keep their fishing operations at the same level if there was no Excise Tax relief in fuel consumption, and some explained that Excise Tax relief increased the fishing power. It was observed that the fishing power was increased though it was not represented by figures.

Since Excise Tax relief lowered the operating costs in fishing activities, it led to the reduction of costs, on one hand, and the increase of profit, on the other. Another outcome of Excise Tax relief was the prevention of the illegal fuel use. It is considered that, reaching cheap fuel under the same conditions, the vessel owners have begun to abandon methods.

#### **4.6.3. Reasons for non-use of fuel subject to Excise Tax relief**

Coastal fishing vessels vary greatly from purse-seiners and trawlers in terms of fuel consumption. Against every 1 l. of fuel consumed by coastal fishing vessels, purse-seiners consume 49.31 l., trawlers 11.38 l., and trawler-purse seiners 14.01 l. This shows that the latter group of fishing vessels take the greatest benefit from Excise Tax relief.

When asked why they did not file an application for being subject to Excise Tax relief, 48.62% of the coastal fishermen replied that the application charges were more than the amount they would benefit from Excise Tax relief, 10.28% replied that there was a lot of paperwork to file an application, and 5.53% replied that they did not know the issue or were given wrong information. Further, a few fishermen stated the following as the reasons of their not being subject to Excise Tax relief: delivery of fuel is subject to a transportation fee; delivery of fuel is completed in one time and a cash payment is required for it; for delivery of fuel to a shelter, an adequate number of applications must be made.

With a share of 46.83% in the total costs of coastal fishermen, it can be said that the fuel costs are crucial with respect to income of coastal fishermen and their fishing effort. However, the fact that 82.14% of coastal fishermen are not subject to Excise Tax relief suggests, as some stated, that that regulation has not been made in a manner, allowing all the groups to benefit from it.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1. Physical and technical features of fishing fleet**

In the fishing fleet of the Black Sea Region, coastal fishing vessels account for 82.14%, and medium and large-scale fishing vessels 17.86% (purse-seiners 6.82%, trawler 9.09%, trawler-purse seiners 1.95%). Out of the coastal fishing vessels, 80.52% are less than 12 m in length and 1.62% are more than 12 m in length. The largest coastal fishing vessel in length is 17.45 m.

On the other hand, medium and large-scale fishing vessels vary from 12.12 m to 60 m in length. Although the purse-seiners and trawlers that are more than 12 m in length are licensed by the DG Protection and Control under the Ministry of Agriculture and Rural Affairs, there are purse-seiners and trawlers that are less than 12 m in length, which have been licensed formerly. The research revealed that the fishing activity was in conformity with the licences (for example, it was determined that the coastal fishing vessels do not use purse-seiners or trawlers although they are more than 12 m in length). Carrier boats were found out to have usually been licensed as purse-seiners. This should be taken into consideration for fisheries management regulations (e.g., catch quota or catch share). However, to be able to apply the regulations like catch quota or catch share, the size of the fisheries resources and the sustainable yield (SY) or maximum sustainable yield (MSY) of those resources should be analysed, and the results of those analyses should be monitored annually. Such kind of analyses requires a high rate of financing. Thus, for now, these will remain secondary for Turkey.

Fishing fleet is 13.33 years old in average. Out of the fishing fleet, the trawler-purse seiners are the youngest (with an average age of 9.50 years) and the trawlers are the oldest (with an average age of 16.90 years). 68.51% of the fishing vessels in the fleet are 15 years old or younger. Considering that the wood vessels have a useful life of 25 years and the sheet metal vessels have 30 years, it is apparent that the fishing fleet in the Black Sea Region has completed more than half of its useful life.

All of the fishing vessels that are less than 12 m in length are constructed of wood and all of those that are more than 20 m in length are of sheet metal. Further, among the vessels that are 12-20 m in length, there are some which are constructed of both wood (80.77%) and sheet metal (19.23%). Most of the wood vessels are older than 20 years of age and consist of purse-seiners operating with conventional methods.

It was determined that the reason of choice of wood as construction material for the vessels that are less than 12 m in length is that such type of vessels do not sink easily when they are afloat, are easily towed to shore, and allow repairing by the fishermen themselves. Wood vessels are constructed of chestnut, which is supplied from the forests in the region and is known to be waterproof. All of the wooden purse-seiners are less than 20 years of age. They are the oldest vessels among purse-seiners, with an average age of 15.6 years. They do not have advanced fishing gear since they usually operate using conventional fishing techniques.

It was found out that while 79.54% of the fishermen in the Black Sea Region had their own vessels, 20.46% of them had a joint ownership. Regarding the joint ownership, the partners are generally brothers or other members of the family.

Coastal fishermen operating family vessels were found to usually operate alone (without being accompanied by their brothers or fathers) or not to pay any share to other members of the family. Thus, this suggests that a coastal fishing vessel inherited to by a family is in fact under the ownership of the family member who operates it alone.

Although it was known that some of the purse-seiners operating in the Black Sea Region (in particular, those operated by brothers) carry out fishing activities together with more than one main boat, this was not reflected in the surveys. This was the result of the fact that each vessel was registered under the name of brothers separately.

As the vessels grow in length, their prices increase. This leads to higher number of vessels that are under joint ownership. Up to 90% of the vessels that are 30 and more in length, which have the highest value in today's figures, are under joint ownership.

79.87% of the fishermen purchased their vessels using their own resources. On the other hand, 11.04% of the fishermen purchased their vessels using loans. In particular, use of loans exhibited a downward trend following the economic crisis of 2001. However, the loans have become attractive again with the macroeconomic improvements and with the drop of interest rates. Bank loans are usually preferred by the fishermen as short-term operating loans.

Lending brokers are another important credit source for the fishermen. Fishermen prefer to get money from the brokers since they do not impose any interest on the money they lend, not make any deductions and since no paperwork is required for borrowing transaction between the fishermen and the brokers as it is based on trustworthiness. Nevertheless, this creates the risk of compulsorily giving of the products to the broker in the future and leaves little room for the fishermen to bargain. Therefore, new regulations for fishermen in terms of short-term operating loans will be useful for them.

Based on the current capacity of the fishing fleet in the Black Sea Region and the situation of fisheries resources, any investments aiming to grow the fishing fleet capacity or increase the fishing power will be in contrary to a sustainable fisheries management and to the EU's Common Fisheries Policy. Thus, with any aids through credits, long-term loans which aim to grow the fleet capacity and increase the fishing power should be avoided.

Fishing vessels have an engine power varying from 6 to 1670 HP. Coastal fishing vessels have the minimum engine power with an average of 39.83 HP and purse-seiners have the maximum with an average of 477.86 HP.

In the interviews with the operators of purse-seiners, the operators explained what gained importance with the reduction of fish stocks were to identify a fish source early and to reach that source in a shorter time. Therefore, purse-seiners tried to both extend the range of fish finders and increase their engine power. It was stated that 2nd and 3rd engines were installed on board the vessels having a small engine power and that on board the new vessels the bigger engines were used. Fishermen needed large vessels to operate in the Mediterranean Sea for fishing for tuna, which emerged as another reason that required them to have larger vessels in length and increase their engine power.

Use (or hiring) of carrier boats to land the catches is seen only among the purse-seiner fishermen. It was found that more than half of the purse-seiner fishermen (61.90%) had their

own carrier boats, 14.28% of them hired a carrier boat, and 23.82% of them never used a carrier boat. Those fishing vessels which do not use a carrier boat are the vessels that have been licensed as a purse-seiner formerly and have small amounts of catch; further, some of those vessels use inexpensive purse-seines, as well as entangling nets and lift nets.

Among the small-scale coastal fishermen, those who own carrier boats primarily operate as the masters of carrier boats, and when those boats are not used, they carry out coastal fishing. The vessel owners reported that they earned much income from the lease of their carrier boats, together with master's share, than that from coastal fishing.

It was found out that the fishing nets were more expensive than the vessel in most of the purse-seiners. Also, it was determined that although the fishing nets were equipped, used and named in different ways, the fishermen used similar fishing nets. Thus, it may be said that there are only a few types of fishing nets and that the fishermen use similar fishing nets.

Based on the observation that all the coastal fishing vessels had fishing rods, they appeared to be more commonly used by the coastal fishermen when compared to fishing nets. Therefore, in the small-scale coastal fishing, both the amount and value of the fish caught by hook fishing are low when compared to catches of those vessels that use fishing nets. It was determined that recreational fishing with fishing rods and sports fishing with small vessels were carried out mainly by the retired persons (called "enjoyment-man" in the region).

Surveys with fishermen revealed that some fishermen do not use lift nets as these make harm to fish. With regard to the fishing gears, only the lift nets were reported to have been reduced in number.

## **5.2. Socio-economic characteristics of fishermen**

It was determined that the fishermen were 25-70 years old, with an average age of 46.45 years. The fact that the number of retired persons who engage in fishing is considerably high in the region (28.53%) leads to an older population among the fishermen. The high average age of fishermen shows that choice of the profession by fishermen is at a low level among the young population. This should be taken into consideration for regulations which aim to reduce the number of fishermen. It is expected that the number of fishermen will enter a downward trend in the long term, especially with the coastal fishermen.

Educational levels of the fishermen are as follows: literate 2.27%; primary education 58.44%; secondary education 14.94%; high school 20.78%; university degree 3.57%.

27.92% of fishermen are not covered by a social security system. Considering that most of the fishermen pay their own insurance premiums, it may be said that they have an awareness of the social security. To make more fishermen be covered by social security institutions, it will be useful to require membership with a social security institution when licensing, make the crew members subject to compulsory insurance for purse-seiners and trawlers, and limit the number of crew members according to vessel's length and tonnage. Regarding purse-seiners and trawlers, in particular, this will be easily applied since the insurance premiums of crew members must be paid jointly by crew members and the vessel owner during the share distribution. Trawler and purse-seiner owners agreed on this, too, during the face-to-face interviews made with them.

To make widespread or compulsory the social security coverage among the fishermen will cause increasing number of retired persons to enter the fisheries sector, in which the average age is already high. This may serve as an opportunity to reduce the number of fishermen.

62.34% of fishermen are members of fisheries co-operatives. It was observed, during the face-to-face interviews with the fishermen, that there was lack of confidence due to ineffectiveness of the fisheries co-operatives and that not much was expected from them in resolving the future problems. One of the main factors of this is that the co-operatives are not placed in a certain location and actually do nothing, but being a statutory organisation. When regulating the fisherman shelters, to assign an office for the co-operative will be useful for the development of it. Another way to make the co-operatives more active will be to perform the task of fisheries management and the other official transactions at the level of co-operatives.

It was determined that the fishermen had a professional experience of 0-63 years, with an average period of 25.05 years, and had a professional fishing experience of 20.74 years in average. Considering the length of professional fishing experience of fishermen, it can be said that they have enough professional experience. When this is the case, to establish a link between the differences of income of the fishermen from length and type categories and the experience will not be easy. Those differences may be a result of the intensity of the fishing power the fishermen employed. The vessels that have the same vessel equipment and fishing gear do not spend the same fishing effort. What the most important reason of this is that the fishermen do not show the same will and have the same capabilities in terms of fishing expenditures with each other. The fishermen explained that the costs of fuel and ship chandlery services, which are required for fishing activities, were high. Fishermen who cannot afford to meet the costs of an increased fishing effort naturally earn a lower income. This once more points to the need to support the fishermen through short-term operating loans.

Although the fishermen in the Black Sea have 1.25 boys in average and the number of children who live with the fisherman and do not engage in fishing is 1.04, only 18.51% of fishermen have their children work as crew members on board their vessels. This suggests that with the higher average age of fishermen a decline in the number of young people who will engage in fishing in the future.

12.01% of fishermen work as crew members on board the vessel of another fisherman. All of those fishing vessels consist of purse-seiners.

There are 22 crew members and 13.81 carriers in average work on board the purse-seiners. On the other hand, the number of crew members working on board the trawlers and trawler-purse seiners is 5.11 and 7.0, respectively.

It was determined that working as crew members on board the fishing vessels created an important job opportunity in the region. Especially, to work as a crew member means so much to the rural people. Due to the fact that the region has limited resources for tourism and industrial development and limited arable lands, fishing appears to be an important means of living for the local people, who have very limited job opportunities in coastal areas. The fishermen (and their family members) who work as carriers or crew members on board the fishing vessels must be considered when a reduction is to be made in the fleet capacity. Each purse-seiner exiting the fleet will at the same time mean a loss of job for 22 crew members

and 14 carriers. Multiplication of these figures by household size will give 126-144 people who will be deprived of fishery income.

### **5.3. Capital structure of fisherman**

It was determined that the total vessel capital of the fishermen in the Black Sea Region varied from YTL 7,602 to 1,935,999 by length category and from YTL 10,551 to 525,709 by type of fishery, with an average value of YTL 102,544. The owned vessels account for 99,25% of the vessel capital.

The fishermen have an active capital varying in amount from YTL 11,689 to 3,160,999 by length category. This variation in the active capital shows that the fishermen are quite different in scale. This is especially more apparent with the vessels that are more than 30 m in length.

It was found out that in the Black Sea Region the commercial fishing activities were usually carried out by fishing nets, as well as fishing gears like dredges, lift nets and diver's equipment for fishing for certain species. However, the fishing nets account for the great proportion of the fishing gear capital.

Entangling nets emerge as the most important fishing gear for the coastal fishermen. Average fishing gear capital was determined to be YTL 5,251. It was observed that the coastal fishing vessels generally had the combinations of whiting-bonito and grey mullet (Russia) entangling nets or whiting-bonito-striped mullet and grey mullet (Russia) entangling nets.

From the medium and large-scale fishing vessels, the purse-seiners have an average fishing gear capital of YTL 707,872. Anchovy-horse mackerel and anchovy-bonito purse-seines are the most common fishing gears. In addition, the vessels more than 40 m in length were determined to have on board the tuna purse-seines.

Trawlers and trawler-purse seiners have bottom trawl as the main fishing gear. Trawlers have an average fishing gear capital of YTL 22,877. The combinations of bottom trawl - entangling nets and bottom trawl - mid-water trawls were the most common fishing gear seen on board the trawlers. As the vessels grow in length, the rate of the combination of bottom trawl - mid-water trawl - entangling nets increases.

Trawler-purse seiners have an average fishing gear capital of YTL 168,925. The combination of bottom trawl - bonito entangling net - bonito purse-seines is the most common fishing gear.

The Black Sea fishery has an average operating capital of YTL 160,492. However, the average operating capitals by type of fishery differ greatly. While the coastal fishing has an average operating capital of YTL 15,802, the average operating capital of the medium and large-scale fishery is YTL 826,062. Purse-seiners appear to have the highest operating capital, with an average amount of YTL 1,752,729.

For the Black Sea fishery, the share of the cash assets in the total active capital is less than 1%, which implies a liquidity problem. This causes the fishermen to borrow from persons (in particular, from brokers). As a matter of fact, 71.79% of total debts of fishermen comprise the liabilities due to persons. Further, the debts arising from renewal and repair of fishing nets account for 8.20% of total debts. This is especially the case with the coastal fishing. Borrowing from brokers by fishermen, in particular, due to low cash assets leads to

weakening of bargaining power when selling their products to brokers, and to buying of fishing nets, fuel, etc. at the prices effective on the due date.

Regarding the Black Sea fishery, the brokers were found out to be the primary source of credit for fishermen when borrowing from persons is the case. Brokers act as a bank, giving credits without requiring complex formalities to be completed and taking back the money they lent through purchasing of fishermen's products. It was discovered that the fishermen also referred to brokers to borrow money for the purposes of equipping and repairing their vessels, as well as meeting their domestic needs.

Equity capital accounts for 89.07% of the total active capital of the fishermen in the Black Sea Region. Foreign capital has a low ratio since the vessel owners generally operate as unlimited companies. In addition, with the negative attitude toward the use of bank loans, in the capital structure, more weight has been put on the equity capital.

Even though the developments in loan facilities in parallel with the macroeconomic developments have created an upward trend in the use of loans, it is considered that those loans will be generally used for meeting the need of floating capital and thus will not be canalised into investments.

#### **5.4. Economic analysis of fishing activity**

Gross receipts of the Black Sea fishery vary in amount from YTL 10.35 to 2,955,500. The variance between the minimum and the maximum values of gross receipts is 286 times. Regarding the type of fishery, the purse-seiners, which are medium and large-scale fishing vessels, have the highest gross receipts. A considerably high relation was determined between the type of fishery and the income.

The status of the net receipts for coastal fishing, which are at a low level, can be easily understood when looked at the gross receipts figures. While the average gross receipts of 10 coastal fishermen having the lowest gross receipts amount to YTL 574, the 10 coastal fishermen having the highest gross receipts have gross receipts amounting to YTL 55,641 in average. The variance between the two types of fishery mentioned above is 96.94 times. That the two types of fishery had different fishing powers has resulted in such a variance as is described above. Although the coastal fishing vessels use the same fishing gear and fishing techniques, the variance between their income was possibly a result of the difference (in one or more factors like fishing gear, vessel size, or the number of crew members) in fishing powers.

Regarding the length category, the length category of 12-20 m had the highest amount of non-operating fishery income. Regarding the type of fishery, on the other hand, the purse-seiners, which are medium and large-scale fishing vessels, have the highest non-operating fishery income.

Average net receipts of the fishermen are YTL 13,867. However, the net receipts differ greatly by length and type categories, as in the gross receipts. While the coastal fishing has net receipts amounting to YTL 1,828, the net receipts of the medium and large-scale fishery amount to YTL 70,146.

Comprising any kind of revenues of fishermen from fishing activities, the fishery income is YTL 5,496 for the length category of <8 m. In the said category, the provision for family labour has the highest share in the fishery income. Similarly, this is also the case with the vessels that are 8-12 m in length. It can be said that the operators of the vessels that are

less than 12 m in length (in a broader sense, the coastal fishing vessels) create job opportunities for both themselves and their family members and thus they earn money in return for their labour. Because, for the vessels that are less than 12 m in length, the provision for family labour has the highest share in the fishery income.

Financial and economic profitability of the Black Sea fishery was positive for each length category and type of fishery. This reveals that the fishing activity has been maintained without any decrease in the operating capital and that it has produced profit. The comparisons of financial profitability calculated by length and type categories with mean interest rate (bank's deposits interest for the accounting period of May 2004 – May 2005) gave positive results (except for the length category of 8-12 m and the trawling-purse seining). This points to the fact that the revenues from fishery are more than the revenues from the conversion of equity capital into money and then investing it to a bank.

## **5.5. Views of fishermen on fishery**

### ***Catch amount***

84.74% of fishermen in the Black Sea Region expect a decrease in the catch amount in the future. Those fishermen having such an expectation are mostly seen among the owners of the vessels that are less than 20 m in length. Further, 41.67% of the fishermen from the length category of 20-30 m and 20% of those from the length category of >30 m expect that the catch amount will show a downward trend. 92.09% of the coastal fishermen said that there would be a decline in the catch amount; conversely, the fishermen from the length category of >20 m said there would be an increase in the catch amount. It is considered that what lay behind the two contradictory views among the coastal fishermen as are described above is the competition between the large-scale and small-scale fishermen.

19.06% of fishermen in the Black Sea Region pointed to the pollution of the sea as the primary cause of the decrease in the catch amount. Among the other causes reported by the fishermen were the violation of catch bans (17.91%), use of sonar (15.59%), and high number of fishing vessels (12.91%).

According to the fishermen, the best way to limit the catch amount is to impose a catch quota. Owners of purse-seiners also show favour to a catch quota (although they are the fishery group who will be affected most from a catch quota). What lay behind this is the increase against the other fishing vessels of catch amount by the purse-seiners that are more than 30 m in length, which have recently increased their fishing power by enlarging their vessels to bigger sizes, increasing their engine power and installing long range sonars on board their vessels, and by those purse-seiners, which form fleets to fish and are usually operated by brothers.

### ***Stopping fishing activities***

51.95% of fishermen stated that they were ready to stop fishing activities, provided that they sell their vessels at market prices and be aided to establish a new business. The length category of 12-20 m had the highest percentage of fishermen who agreed to stop fishing activities, with a rate of 65.38%. Further, from the length category of <8 m, 50.27% of fishermen are ready to stop fishing activities (although that category comprises the retired persons and the non-commercial fishermen). Considering that the fishermen have are at an



average of 46.45 years and that the local people are dependent on the sea, a 51.95% rate of fishermen who are ready to stop fishing activities is quite significant and important. When asked what types of state aids they requested in return for stopping fishing activities, 63.13% of fishermen requested to be placed in a job. This implies that the job opportunities in the region will be important when reducing the number of fishermen in the future.

The rate of coastal fishermen who agree to stop fishing activities, provided that they sell their vessels at market prices, remained low when compared to the trawler-purse seiner fishermen and the trawler fishermen. Although the coastal fishermen earn a lower income than the medium and large-scale fishermen, the rate of those who disagreed to stop fishing activities was high except for purse-seiners. That there is considerably a high number of recreational fishermen in that type of fishery may be the cause of such a high percentage of disapproval among those fishermen. Because, the non-professional fishermen buy fishing vessels only for recreational purposes. For them, the revenue that the vessel may bring does not mean much. What is important for them is to be in fishing.

### ***Organisation***

Fishermen think that the reduction of fish stocks due to over-fishing is the most important problem of the fisheries sector. It was observed that the fishermen closely watched any changes in the amount of fish they caught, established a direct link between the fish amount and the income, however, that they did not attach much importance to the benefits that might be obtained from the marketing of fish, its price, and organisation.

62.34% of fishermen are members of fisheries co-operatives. However, most of those fishermen explained that the co-operatives were not effective and that ineffectiveness created a problem with respect to fishery. This suggested that establishment of fisheries co-operatives was a statutory one without being adopted by the fishermen. It was found out that the fishermen did not make any efforts in organisation and make the co-operatives effective, in particular (although they see these as a problem) and that what they understood from a co-operative was that it was an organ which required compulsory membership. Besides, another finding regarding co-operatives is that the co-operative directors are elected among the reputable and leading figures in the region. This may be useful to make co-operatives be effective organisations.

### ***Increase of consumption***

When asked whether or not campaigns for the promotion and diversification of fish consumption as in the nut sector would be useful, the fishermen replied that it would not mean much for them. 61.36% of fishermen think that the fish consumption is at a normal level or does not pose a problem.

### ***Fuel Excise Tax relief***

It was determined that the coastal fishermen were not subject to Excise Tax relief in fuel consumption. Excise Tax relief was advantageous only for the medium and large-scale fishermen. It was determined that the coastal fishermen did not file an application for being subject to Excise Tax relief since they would spend as much as the amount they would benefit from Excise Tax relief in fuel consumption.

Considering that 60.71% of fishermen consist of coastal fishermen and that they have the lowest rate of income, it can be said that the Excise Tax relief is an arguable application in terms of social aspects. Another point that should be taken into consideration with respect to Excise Tax relief is whether or not the application causes over-fishing. In theory, a fishing activity continues until the marginal cost is equal to the marginal income. As a decrease in the fuel costs will decrease the marginal cost, the production (catch amount) will increase with the pre-conditions that the fish finding costs will increase and the catch amount will decline as a result of the decrease in fish stocks at the end of the fishing year. This means that Excise Tax relief will at least in theory increase the fishing effort.

Since contradictory statements were made by the fishermen during the interviews with them, to make an evaluation on that issue was not possible. While some of the fishermen (in particular, the owners of purse-seiners) admitted that they engaged in over-fishing, some stated that fishing was their ordinary business and had to do it even if there was no Excise Tax relief.

Despite the negative aspects of Excise Tax relief as are described above, it has eliminated the illegal fuel use. With Excise Tax relief, the fuel costs have been recorded.

In order to strike a balance between the small-scale fishermen and the medium/large-scale fishermen concerning the consumption of fuel with Excise Tax relief, a certain rate of reduction should be made in the application charges in favour of the coastal fishermen. The application charges may be made more balanced by setting an amount over the estimated fuel consumption to be determined beforehand according to length and type categories. So, by applying a cheaper tariff to the coastal fishermen, it can be ensured that they file an application for being subject to Excise Tax relief easily. The expenses arising from the application may be compensated by the revenues from other types of fishery.

## **5.6. Recommendations**

The Black Sea Region has a special importance for the Turkish fisheries sector, in terms of both the amount of fish caught and the job opportunities created for the local people. To ensure a sustainable and efficient fishing activity in the region, the following problems must be resolved at first.

The Turkish fisheries sector faces several structural, technical and application problems. These are the most important problems:

- That the size of the exploitable fish stocks and of the levels of sustainable fishing are not determined;
- That the entire fishing fleet operates in the Turkish territorial waters;
- Due to lack of organisation in the sector, that the catch amount sees significant fluctuations because of the fact that a self-control mechanism is not in place among the fishermen;
- That the penal provisions of the Fisheries Law No. 1380 regarding catch bans are not preventive at the required level;
- That the protection and control officials are not empowered with the required authorities.

These are the recommendations on the solutions of the above-listed problems of the fishing sector:

- Re-establishment of the Directorate General of Fisheries
- Identifying the size of exploitable marine fish stocks and their sustainable yield;
- Identifying the size of the fishing fleet with which the sustainable yield can be harvested for the fish stocks whose sustainable yield is determined;
- Regulation of the fishing data (fishing zone, time of fishing, fishing gear, time at sea, fishing technique, etc.) in line with the EU's minimum statistical requirements and with the needs of executive institutions;
- Stopping gradually of the fishing activities of the fishermen (or fishing vessels) whose activities do not have an economic value, taking into consideration their socio-economic situations;
- To have a self-control mechanism among fishermen, identification of marine fishing zones and transfer to co-operatives the right to use those zones;
- Direction of the fishing vessels which have necessary equipment toward high seas making international agreements for that purpose;
- Regulation of fishing nets and other equipment, which will be installed on board the vessels, according to the length and type categories, and standardisation of the fishing fleet,
- Freeze the number of licences;
- Legalisation of the regulations regarding licence transfer;
- Increase the selectivity of fishing gear to prevent over-fishing regarding specific fish species;
- Investigation of suitable high seas fishing zones and direction of a part of the fishing fleet toward high seas fishery under international agreements (giving incentives like credits, cheap fuel, etc. for this purpose, when necessary);
- Completion of the organisation of fishermen as co-operatives and co-operative unions;
- To have a self-control mechanism among fishermen, identification of marine fishing zones and transfer to co-operatives the right to use those zones;
- For specific fish stocks to be selected, implementation of resource share following the determination of the stock size;
- Prevention of unplanned growth of fish processing facilities, in particular fish meal facilities; and
- Adapting the Fisheries Law No. 1380 to today's conditions, granting more powers to the protection and control officials, and review of the fishing periods, bans, and penal provisions.

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## ADDITIONAL TABLES

**Additional Table 1.** Breakdown of the fishing vessels of different age groups by length and type categories (%)

Length (m)	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	
< 8	18.18	24.06	24.60	16.58	11.76	2.67	1.07	1.07	-	
8-12	13.11	34.43	31.15	13.11	4.92	1.64	-	-	1.64	
12-20	19.23	26.92	11.54	3.85	11.54	11.54	7.69	3.85	3.85	
20-30	12.50	33.33	20.83	25.00	4.17	4.17	-	-	-	
≥30	10.00	40.00	20.00	20.00	-	10.00	-	-	-	
Type of fishery										
Average of small-scale (Coastal fishing) fishery		<b>17.00</b>	<b>26.88</b>	<b>26.09</b>	<b>15.42</b>	<b>10.28</b>	<b>2.37</b>	<b>0.79</b>	<b>0.79</b>	<b>0.40</b>
Medium and large scale fishery	Purse-seiner	19.05	33.33	14.29	23.81	-	4.76	4.76	-	-
	Trawler	7.14	32.14	14.29	14.29	7.14	14.29	3.57	3.57	3.57
	Trawler-Purse seiner	33.34	16.67	33.33	-	16.67	-	-	-	-
	Average	<b>14.55</b>	<b>30.91</b>	<b>16.36</b>	<b>16.36</b>	<b>5.45</b>	<b>9.09</b>	<b>3.64</b>	<b>1.82</b>	<b>1.82</b>
Overall average		<b>16.56</b>	<b>27.60</b>	<b>24.35</b>	<b>15.58</b>	<b>9.42</b>	<b>3.57</b>	<b>1.30</b>	<b>0.97</b>	<b>0.65</b>

**Additional Table 2.** Breakdown of the construction materials of fishing vessels by length and type categories (%)

Length (m)		Construction material	
		Wood	Sheet metal
< 8		100.00	-
8-12		100.00	-
12-20		80.81	19.19
20-30		-	100.00
≥30		-	100.00
Type of fishery			
Average of small-scale (Coastal fishing) fishery		<b>99.60</b>	<b>0.40</b>
Medium and large scale fishery	Purse-seiner	23.81	76.19
	Trawler	35.71	64.29
	Trawler-Purse seiner	33.33	66.67
	Average	<b>30.91</b>	<b>69.09</b>
Overall average		<b>87.34</b>	<b>12.66</b>



**Additional Table 3.** Ownership of the main boats by length and type categories (%)

Length (m)	Vessel ownership			
	Owner	Partner		
		Non-family member	Family member	
< 8	89.30	5.88	4.81	
8-12	81.97	4.92	13.11	
12-20	57.69	26.92	15.38	
20-30	50.00	8.33	41.67	
≥30	10.00	20.00	70.00	
<b>Type of fishery</b>				
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>86.96</b>	<b>5.93</b>	<b>7.11</b>
Medium and large scale fishery	Purse-seiner	42.86	14.29	42.86
	Trawler	39.29	21.43	39.29
	Trawler-Purse seiner	83.33	16.67	-
	Average	<b>45.46</b>	<b>18.18</b>	<b>36.37</b>
<b>Overall average</b>		<b>79.55</b>	<b>8.12</b>	<b>12.34</b>

**Additional Table 4.** Rate of the owners of the accompanying boats and carrier boats by length and type categories (%)

Length (m)	Accompanying boat		Carrier boat		
	Owner	Lease holder	Owner	Lease holder	
< 8	0.53	-	1.07	-	
8-12	1.64	-	-	-	
12-20	-	-	3.85	-	
20-30	-	4.17	12.50	4.17	
≥30	10.00	-	90.00	10.00 (+%20)	
<b>Type of fishery</b>					
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>0.79</b>	<b>-</b>	<b>0.79</b>	<b>-</b>
Medium and large scale fishery	Purse-seiner	4.76	4.76	61.90	19.05
	Trawler	-	-	-	-
	Trawler-Purse seiner	-	-	-	-
	Average	<b>1.82</b>	<b>1.82</b>	<b>23.63</b>	<b>7.27</b>
<b>Overall average</b>		<b>0.97</b>	<b>0.32</b>	<b>4.87</b>	<b>1.30</b>

**Additional Table 5.** Type of purchase for the fishing vessels by length and type categories (%)

Length (m)	Type of purchase				
	Own resource	Loan	Debt	Inherited	
< 8	81.28	7.49	10.16	1.07	
8-12	75.41	14.75	8.20	1.64	
12-20	76.92	19.23	3.85	0.00	
20-30	87.50	12.50	-	-	
≥30	70.00	30.00	-	-	
<b>Type of fishery</b>					
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>80.22</b>	<b>8.70</b>	<b>9.89</b>	<b>1.19</b>
Medium and large scale fishery	Purse-seiner	71.43	28.57	-	-
	Trawler	85.71	14.29	-	-
	Trawler-Purse seiner	66.67	33.33	-	-
	Average	<b>78.18</b>	<b>21.82</b>	-	-
<b>Overall average</b>		<b>79.87</b>	<b>11.04</b>	<b>8.12</b>	<b>0.97</b>

**Additional Table 6.** Average age and civil status of fishermen by length and type categories (year-%)

Length (m)	Average age	Civil status		
		Married	Single	
< 8	47.43	83.96	16.04	
8-12	44.44	83.61	16.39	
12-20	45.15	92.31	7.69	
20-30	45.46	91.67	8.33	
≥30	46.20	80.00	20.00	
<b>Type of fishery</b>				
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>46.69</b>	<b>84.19</b>	<b>15.81</b>
Medium and large scale fishery	Purse-seiner	47.29	85.71	14.29
	Trawler	41.82	89.29	10.71
	Trawler-Purse seiner	55.00	100.00	-
	Average	<b>45.35</b>	<b>89.09</b>	<b>10.91</b>
<b>Overall average</b>		<b>46.45</b>	<b>85.06</b>	<b>14.94</b>

**Additional Table 7.** Educational level of fishermen by length and type categories (%)

Length (m)		Educational level				
		Literate	Primary education	Secondary education	High school	University degree
< 8		2.67	57.22	13.90	21.39	4.81
8-12		1.64	54.10	19.67	24.59	-
12-20		-	69.23	11.54	19.23	-
20-30		-	75.00	8.33	12.50	4.17
≥30		10.00	40.00	30.00	10.00	10.00
Type of fishery						
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>2.37</b>	<b>57.31</b>	<b>15.42</b>	<b>21.74</b>	<b>3.16</b>
Medium and large scale fishery	Purse-seiner	-	52.38	23.81	14.29	9.52
	Trawler	3.57	67.86	7.14	21.43	-
	Trawler-Purse seiner	-	83.33	-	-	16.67
	Average	<b>1.82</b>	<b>63.64</b>	<b>12.73</b>	<b>16.37</b>	<b>5.45</b>
<b>Overall average</b>		<b>2.27</b>	<b>58.44</b>	<b>14.94</b>	<b>20.78</b>	<b>3.57</b>

**Additional Table 8.** Educational level of spouses of fishermen by length and type categories (%)

Length (m)		Educational level					
		n	Literate	Primary education	Secondary education	High school	University degree
< 8		157	14.01	60.51	7.64	16.56	1.27
8-12		51	3.92	72.55	7.84	13.73	1.96
12-20		24	4.17	79.17	16.67	-	-
20-30		22	-	36.36	31.82	31.82	-
≥30		8	-	87.50	-	12.50	-
Type of fishery							
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>213</b>	<b>10.80</b>	<b>65.73</b>	<b>7.04</b>	<b>15.02</b>	<b>1.41</b>
Medium and large scale fishery	Purse-seiner	18	-	72.22	5.56	22.22	-
	Trawler	25	4.00	56.00	32.00	8.00	-
	Trawler-Purse seiner	6	-	50.00	16.67	33.33	-
	Average		2.04	61.22	20.41	16.33	0.00
<b>Overall average</b>			9.54	63.36	10.31	15.65	1.15

**Additional Table 9.** Home ownership status of fishermen by length and type categories (%)

Length (m)		Have a home?	
		Yes	No
< 8		68.45	31.55
8-12		78.69	21.31
12-20		100.00	-
20-30		100.00	-
≥30		100.00	-
Type of fishery			
Average of small-scale (Coastal fishing) fishery		<b>71.54</b>	<b>28.46</b>
Medium and large scale fishery	Purse-seiner	100.00	-
	Trawler	100.00	-
	Trawler-Purse seiner	100.00	-
	Average	<b>100.00</b>	-
<b>Overall average</b>		<b>76.62</b>	<b>23.38</b>

**Additional Table 10.** Car ownership status of fishermen by length and type categories (%)

Length (m)		Have a car?	
		Yes	No
< 8		18.72	81.28
8-12		21.31	78.69
12-20		23.08	76.92
20-30		58.33	41.67
≥30		100.00	-
Type of fishery			
Average of small-scale (Coastal fishing) fishery		<b>18.97</b>	<b>81.03</b>
Medium and large scale fishery	Purse-seiner	76.19	23.81
	Trawler	42.86	57.14
	Trawler-Purse seiner	33.33	66.67
	Average	<b>54.55</b>	<b>45.45</b>
<b>Overall average</b>		<b>25.32</b>	<b>74.68</b>

**Additional Table 11.** Previous job status of fishermen by length and type categories

Length (m)		Previous job	
		Had a job	First job
< 8		59.36	40.64
8-12		32.79	67.21
12-20		26.92	73.08
20-30		20.83	79.17
≥30		40.00	60.00
Type of fishery			
Average of small-scale (Coastal fishing) fishery		<b>52.17</b>	<b>47.83</b>
Medium and large scale fishery	Purse-seiner	33.33	66.67
	Trawler	25.00	75.00
	Trawler-Purse seiner	16.67	83.33
	Average	<b>27.27</b>	<b>72.73</b>
<b>Overall average</b>		<b>47.73</b>	<b>52.27</b>

**Additional Table 12.** Previous vessel ownership status of fishermen by length and type categories (%)

Length (m)	Previous vessel ownership		
	Own	Do not own	
< 8	45.45	54.55	
8-12	60.66	39.34	
12-20	73.08	26.92	
20-30	66.67	33.33	
≥30	50.00	50.00	
Type of fishery			
Average of small-scale (Coastal fishing) fishery		<b>49.80</b>	<b>50.20</b>
Medium and large scale fishery	Purse-seiner	57.14	42.86
	Trawler	71.43	28.57
	Trawler-Purse seiner	66.67	33.33
	Average	<b>65.45</b>	<b>34.55</b>
Overall average		<b>52.60</b>	<b>47.40</b>

**Additional Table 13.** Fishermen who have their children work as crew members on board the vessel by length and type categories (%)

Length (m)	Have children working as crew members on board the vessel?				
	Yes	No	Max.	Average	
< 8	16.04	83.96	3.00	0.19	
8-12	18.03	81.97	2.00	0.23	
12-20	30.77	69.23	2.00	0.38	
20-30	20.83	79.17	3.00	0.33	
≥30	30.00	70.00	1.00	0.30	
Type of fishery					
Average of small-scale (Coastal fishing) fishery		<b>17.00</b>	<b>83.00</b>	<b>3.00</b>	<b>0.20</b>
Medium and large scale fishery	Purse-seiner	28.57	71.43	3.00	0.43
	Trawler	17.86	82.14	1.00	0.18
	Trawler-Purse seiner	50.00	50.00	2.00	0.83
	Average	<b>25.46</b>	<b>74.54</b>	<b>1.87</b>	<b>0.35</b>
Overall average		<b>18.51</b>	<b>81.49</b>	<b>3.00</b>	<b>0.23</b>

**Additional Table 14.** Average number of crew members by length and type categories

Length (m)	Average number of crew members	
< 8	1.10	
8-12	2.20	
12-20	4.73	
20-30	9.50	
≥30	31.20	
Type of fishery		
<b>Average of small-scale (Coastal fishing) fishery</b>	<b>1.40</b>	
Medium and large scale fishery	Purse-seiner	22.00
	Trawler	5.11
	Trawler-Purse seiner	7.00
	Average	<b>11.76</b>
<b>Overall average</b>	<b>3.25</b>	

**Additional Table 15.** Test of variance between the fishermen who want their to become a fishermen and those who do not want them to become a fishermen by type of fishery

Oneway							
Test of Homogeneity of Variances							
answer							
Levene Statistic	df1	df2	Sig.				
83,196	4	358	0				
ANOVA							
answer							
	Sum of Squares	df	Mean Square	F	Sig.		
Between Groups	10,837	4	2,709	26,556	0		
Within Groups	36,524	358	0,102				
Total	47,361	362					
Multiple Comparisons							
Dependent Variable: answer							
	(I) type of fishing	(J) type of fishing	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffé	Coastal fishing vessel	Purse-seiner	.52400(*)	0.07254	0	0.2994	0.7486
		Trawler	.20257(*)	0.06362	0.04	0.0056	0.3995
		Trawler-Purse seiner	.45257(*)	0.13193	0.021	0.044	0.8611
		Medium and large-scale fishery	.35257(*)	0.04752	0	0.2054	0.4997
		Purse-seiner	Coastal fishing vessel	-.52400(*)	0.07254	0	-0.7486
		Trawler	-.32143(*)	0.09221	0.017	-0.6069	-0.0359
		Trawler-Purse seiner	-0.07143	0.14786	0.994	-0.5292	0.3864
		Medium and large-scale fishery	-0.17143	0.08193	0.359	-0.4251	0.0823

	Trawler	Coastal fishing vessel	-0.20257(*)	0.06362	0.04	-0.3995	-0.0056
		Purse-seiner	.32143(*)	0.09221	0.017	0.0359	0.6069
		Trawl – Purse-seiner	0.25	0.14369	0.554	-0.1949	0.6949
		Medium and large-scale fishery	0.15	0.07415	0.395	-0.0796	0.3796
	Trawler-Purse seiner	Coastal fishing vessel	-0.45257(*)	0.13193	0.021	-0.8611	-0.044
		Purse-seiner	0.07143	0.14786	0.994	-0.3864	0.5292
		Trawler	-0.25	0.14369	0.554	-0.6949	0.1949
		Medium and large-scale fishery	-0.1	0.13733	0.97	-0.5252	0.3252
	Medium and large-scale fishery	Coastal fishing vessel	-0.35257(*)	0.04752	0	-0.4997	-0.2054
		Purse-seiner	0.17143	0.08193	0.359	-0.0823	0.4251
		Trawler	-0.15	0.07415	0.395	-0.3796	0.0796
		Trawler-Purse seiner	0.1	0.13733	0.97	-0.3252	0.5252
Tamhane	Coastal fishing vessel	Purse-seiner	.52400(*)	0.11146	0.001	0.1748	0.8732
		Trawler	0.20257	0.0844	0.209	-0.0535	0.4586
		Trawler-Purse seiner	0.45257	0.22401	0.647	-0.6062	1.5114
		Medium and large-scale fishery	.35257(*)	0.068	0	0.1547	0.5504
	Purse-seiner	Coastal fishing vessel	-0.52400(*)	0.11146	0.001	-0.8732	-0.1748
		Trawler	-0.32143	0.13853	0.228	-0.732	0.0892
		Trawler-Purse seiner	-0.07143	0.24949	1	-1.0394	0.8966
		Medium and large-scale fishery	-0.17143	0.12919	0.883	-0.557	0.2142
	Trawler	Coastal fishing vessel	-0.20257	0.0844	0.209	-0.4586	0.0535
		Purse-seiner	0.32143	0.13853	0.228	-0.0892	0.732
		Trawler-Purse seiner	0.25	0.23863	0.982	-0.7402	1.2402
		Medium and large-scale fishery	0.15	0.10672	0.835	-0.1601	0.4601
	Trawler-Purse seiner	Coastal fishing vessel	-0.45257	0.22401	0.647	-1.5114	0.6062
		Purse-seiner	0.07143	0.24949	1	-0.8966	1.0394
		Trawler	-0.25	0.23863	0.982	-1.2402	0.7402
		Medium and large-scale fishery	-0.1	0.23333	1	-1.1087	0.9087
	Medium and large-scale fishery	Coastal fishing vessel	-0.35257(*)	0.068	0	-0.5504	-0.1547
		Purse-seiner	0.17143	0.12919	0.883	-0.2142	0.557
		Trawler	-0.15	0.10672	0.835	-0.4601	0.1601
		Purse seiner - trawler	0.1	0.23333	1	-0.9087	1.1087
*	The mean difference is significant at the .05 level.						

**Additional Table 16.** Rate of fishermen working as a crew member on board the vessel of another fisherman (%)

Length (m)	Work as a crew member on board the vessel of another fisherman?		
	Yes (%)	No (%)	
< 8	11.23	88.77	
8-12	18.03	81.97	
12-20	15.38	84.62	
20-30	4.17	95.83	
≥30	-	100.00	
<b>Type of fishery</b>			
<b>Average of small-scale (Coastal fishing) fishery</b>	<b>13.04</b>	<b>86.96</b>	
Medium and large scale fishery	Purse-seiner	14.29	85.71
	Trawler	3.57	96.43
	Trawler-Purse seiner	-	100.00
	Average	<b>7.27</b>	<b>92.73</b>
<b>Overall average</b>	<b>12.01</b>	<b>87.99</b>	

**Additional Table 17.** Capital of the fishermen's accompanying boats (YTL) (\*)

Length (m)	Accompanying boat (Owner)		Accompanying boat (Hired)		Accompanying boat (Leased)		
	Number of vessels	Average value	Number of vessels	Average value	Number of vessels	Average value	
< 8	1	5,500	-	-	1	200,000	
8-12	1	10,000	-	-	-	-	
12-20	-	-	-	-	-	-	
20-30	-	-	1	90,000	-	-	
≥30	1	3,375,000	-	-	-	-	
<b>Type of fishery</b>							
<b>Average of small-scale (Coastal fishing) fishery</b>	<b>2</b>	<b>7,750</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>200,000</b>	
Medium and large scale fishery	Purse-seiner	1	3,375,000	1	90,000	-	-
	Trawler	-	-	-	-	-	-
	Trawler-Purse seiner	-	-	-	-	-	-
	Average	<b>0.38</b>	<b>1,288,636.36</b>	<b>0.38</b>	<b>34,363.64</b>	<b>-</b>	<b>-</b>
<b>Overall average</b>	<b>3</b>	<b>1,130,167</b>	<b>1</b>	<b>90,000</b>	<b>1</b>	<b>200,000</b>	

(\*) For fishermen who have an accompanying boat



**Additional Table 18.** Capital of the fishermen's carrier boats (YTL) (\*)

Length (m)	Carrier boat (Owner)		Carrier boat (Hired)		Carrier boat (Leased)	
	Number of vessels	Average value	Number of vessels	Average value	Number of vessels	Average value
< 8	2	165,000	-	-	-	-
8-12	-	-	-	-	-	-
12-20	1	2,000	-	-	1	150,000
20-30	3	65,000	1	200,000	-	-
≥30	9	243,333	3	98,333	-	-
Type of fishery						
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>2</b>	<b>165,000</b>	-	-	-
Medium and large scale fishery	Purse-seiner	13	183,615	4	123,750	1
	Trawler	-	-	-	-	-
	Trawler-Purse seiner	-	-	-	-	-
	Average	<b>4.96</b>	<b>70,107.55</b>	<b>1.53</b>	<b>47,250.00</b>	<b>0.38</b>
<b>Overall average</b>		<b>15</b>	<b>181,133</b>	<b>4</b>	<b>123,750</b>	<b>1</b>

(\*) For fishermen who have a carrier boat

**Additional Table 19.** Average value of fishing gear (YTL)

Fishing gear		Average value	Fishing gear		Average value
Entangling nets	Striped mullet	574	Purse-seines	Anchovy	370,882
	Bluefish <i>spp.</i>	850		Horse mackerel	325,714
	Black scorpion fish	658		Tuna	600,000
	Horse mackerel	1,009		Bonito	208,214
	Turbot	1,476	Mid-water trawl	22,472	
	Bluefish	1,201	Bottom trawl	6,944	
	Whiting	657	Cast net	205	
	Bonito	2,415	Horse mackerel cast net	1,471	
	Short-body sardinella	830	Grey mullet (Russia) cast net	3,222	
	Grey mullet (Turkey)	1,050	Lampara net	8,900	
Gav fish	1,250	Lift net	548		
Spear	750	Diver's equipment	3,812		

**Additional Table 20.** Test of variance between the income of fishermen by type of fishery

Test of Homogeneity of Variances							
income							
Levene Statistic	df1	df2	Sig.				
84,502	4	358	0				
ANOVA							
income							
	Sum of Squares	df	Mean Square	F	Sig.		
Between Groups	1,54162E+19	4	3,85404E+18	59,083	0		
<b>Within Groups</b>	2,33528E+19	358	6,52312E+16				
Total	3,87689E+19	362					
Post Hoc Tests							
Multiple Comparisons							
Dependent Variable: income							
	(I) type of fishing	(J) type of fishing	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	Coastal fishing vessel	Purse-seiner	-757282277,38566(*)	58000687.75	0	-936874075.5	-577690479.3
		Trawler	-113217098,8	50867647.56	0.294	-270722339.6	44288141.94
		Trawler-Purse seiner	-156179182,1	105497402.3	0.701	-482838553.1	170480188.8
	Purse-seiner	Medium and large-scale fishery	-363819666,99605(*)	37998068.63	0	-481475883.4	-246163450.6
		Coastal fishing vessel	757282277,38566(*)	58000687.75	0	577690479.3	936874075.5
		Trawler	644065178,57143(*)	73728796.84	0	415773278.8	872357078.3
	Trawler	Trawler-Purse seiner	601103095,23810(*)	118229098.9	0	235021635.3	967184555.1
		Medium and large-scale fishery	393462610,38961(*)	65515426.7	0	190602373.1	596322847.7
		Coastal fishing vessel	113217098,8	50867647.56	0.294	-44288141.94	270722339.6
	Trawler-Purse seiner	Purse-seiner	-644065178,57143(*)	73728796.84	0	-872357078.3	-415773278.8
		Trawler-Purse seiner	-42962083,33	114898031.3	0.998	-398729313.7	312805147
		Medium and large-scale fishery	-250602568,18182(*)	59293413.83	0.002	-434197129.1	-67008007.22
Medium and large-scale fishery	Coastal fishing vessel	156179182,1	105497402.3	0.701	-170480188.8	482838553.1	
	Purse-seiner	-601103095,23810(*)	118229098.9	0	-967184555.1	-235021635.3	
	Trawler	42962083,33	114898031.3	0.998	-312805147	398729313.7	
Coastal fishing vessel	Medium and large-scale fishery	-207640484,8	109808438.9	0.468	-547648435.6	132367465.9	
	Coastal fishing vessel	363819666,99605(*)	37998068.63	0	246163450.6	481475883.4	
	Purse-seiner	-393462610,38961(*)	65515426.7	0	-596322847.7	-190602373.1	
Purse-seiner	Trawler	250602568,18182(*)	59293413.83	0.002	67008007.22	434197129.1	
	Trawler-Purse seiner	207640484,8	109808438.9	0.468	-132367465.9	547648435.6	
	Trawler	-113217098,81423(*)	24137891.35	0.001	-186754717.2	-39679480.39	
Trawler	Trawler-Purse seiner	-156179182,1	53107486.82	0.279	-408226347.7	95867983.43	
	Medium and large-scale fishery	-363819666,99605(*)	69365212.69	0	-566270677.1	-161368656.9	
	Coastal fishing vessel	113217098,8	50867647.56	0.294	-44288141.94	270722339.6	

		large-scale fishery					
	Purse-seiner	Coastal fishing	757282277,38566(*)	142224905.8	0	310230176.2	1204334379
		Trawler	644065178,57143(*)	144253809	0.002	193612771.5	1094517586
		Trawler-Purse seiner	601103095,23810(*)	151812149.6	0.006	133558692.4	1068647498
		Medium and large-scale fishery	393462610,4	158234182	0.172	-84494552.25	871419773
	Trawler	Coastal fishing	113217098,81423(*)	24137891.35	0.001	39679480.39	186754717.2
		Purse-seiner	-644065178,57143(*)	144253809	0.002	-1094517586	-193612771.5
		Trawler-Purse seiner	-42962083,33	58323603.66	0.999	-274061708.6	188137541.9
		Medium and large-scale fishery	-250602568,18182(*)	73435484.07	0.011	-463304631	-37900505.41
	Trawler-Purse seiner	Coastal fishing vessel	156179182,1	53107486.82	0.279	-95867983.43	408226347.7
		Purse-seiner	-601103095,23810(*)	151812149.6	0.006	-1068647498	-133558692.4
		Trawler	42962083,33	58323603.66	0.999	-188137541.9	274061708.6
		Medium and large-scale fishery	-207640484,8	87352948.88	0.218	-472339544	57058574.32
	Medium and large-scale fishery	Coastal fishing vessel	363819666,99605(*)	69365212.69	0	161368656.9	566270677.1
		Purse-seiner	-393462610,4	158234182	0.172	-871419773	84494552.25
		Trawler	250602568,18182(*)	73435484.07	0.011	37900505.41	463304631
		Trawler-Purse seiner	207640484,8	87352948.88	0.218	-57058574.32	472339544
*	The mean difference is significant at the .05 level.						

**Additional Table 21. Fishing nets' depreciation by length and type categories (YTL)**

Length (m)	Entangling nets' depreciation			Purse-seiners' depreciation			Total depreciation	
	Min	Max	Average	Min	Max	Average		
< 8	-	2,500.50	593.57	-	-	-	593.57	
8-12	5.00	5,834.50	1,569.97	-	-	-	1,569.97	
12-20	8.50	3,400.00	1,757.87	200.00	3,750.00	440.38	2,198.25	
20-30	167.00	10,002.00	4,483.54	1,750.00	20,000.00	6,781.25	11,264.79	
≥30	-	-	-	5,000.00	62,500.00	48,500.00	48,500.00	
Type of fishery								
<b>Average of small-scale (Coastal fishing) fishery</b>								
	-	<b>5,835.00</b>	<b>868.00</b>	-	-	-	<b>868.00</b>	
Medium and large scale fishery	Purse-seiner	50.00	2,501.00	446.91	200.00	125,000.00	35,260.00	35,706.91
	Trawler	8.00	10,002.00	3,827.00	-	-	-	3,827.00
	Trawler-Purse seiner	167.00	10,002.00	3,848.00	500.00	15,000.00	7,292.00	11,140.00
	Average	<b>41.38</b>	<b>7,137.98</b>	<b>2,538.71</b>	<b>130.91</b>	<b>49,363.64</b>	<b>14,258.40</b>	<b>16,797.11</b>
<b>Overall average</b>								
	-	<b>10,002.00</b>	<b>1,166.00</b>	<b>200.00</b>	<b>125,000.00</b>	<b>2,546.00</b>	<b>3,712.00</b>	

**Additional Table 22.** Catch estimations by length and type categories

Length (m)	Catch increase	Catch decrease	Stable catch	
< 8	7.49	92.51	-	
8-12	4.92	93.44	1.64	
12-20	11.54	73.08	15.38	
20-30	41.67	41.67	16.67	
≥30	60.00	20.00	20.00	
Type of fishery				
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>7.51</b>	<b>92.09</b>	<b>0.40</b>
Medium and large scale fishery	Purse-seiner	38.10	52.38	9.52
	Trawler	25.00	53.57	21.43
	Trawler-Purse seiner	33.33	33.33	33.33
	Average	<b>30.91</b>	<b>50.91</b>	<b>18.18</b>
<b>Overall average</b>		<b>11.69</b>	<b>84.74</b>	<b>3.57</b>

**Additional Table 4.23.** Requirements for catch quota by length and type categories (%)

	Length (m)					Type of fishery				Total	
	< 8	8–12	12-20	20-30	≥30	Small-scale fishery (Coastal fishing)	Medium and large scale fishery				
							Purse-seiner	Trawler	Trawler-Purse seiner		Total
Limit the fishing period	91.51	5.79	2.70	-	-	<b>92.28</b>	5.02	2.70	-	<b>7.72</b>	<b>100.00</b>
Reduce the number of fishermen	82.58	5.71	8.11	3.60	-	<b>89.49</b>	5.41	5.11	-	<b>10.51</b>	<b>100.00</b>
Impose a catch quota for a single cruise	81.75	16.20	2.05	-	-	<b>93.11</b>	6.89	-	-	<b>6.89</b>	<b>100.00</b>
Limit the vessel size	70.96	17.40	8.14	2.71	0.79	<b>92.88</b>	1.92	4.41	0.79	<b>7.12</b>	<b>100.00</b>
Prohibit fishing in some areas	70.77	18.15	9.23	-	1.85	<b>95.69</b>	1.23	1.23	1.85	<b>4.31</b>	<b>100.00</b>
Impose quota	75.56	17.63	4.69	2.12	-	<b>91.74</b>	4.69	3.57	-	<b>8.26</b>	<b>100.00</b>
Limit the fishing nets	65.65	15.27	9.54	9.54	-	<b>79.01</b>	9.54	11.45	-	<b>20.99</b>	<b>100.00</b>
Other	39.47	28.95	22.81	8.77	-	<b>79.82</b>	5.70	14.47	-	<b>20.18</b>	<b>100.00</b>

**Additional Table 24.** Fishermen who agree/disagree to stop fishing activities, provided that they sell their vessels at market prices, by length and type categories (%)

Length (m)		YES	NO	Total
< 8		50.27	49.73	100.00
8-12		57.38	42.62	100.00
12-20		65.38	34.62	100.00
20-30		41.67	58.33	100.00
≥30		40.00	60.00	100.00
Type of fishery				
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>51.78</b>	<b>48.22</b>	<b>100.00</b>
Medium and large scale fishery	Purse-seiner	42.86	57.14	100.00
	Trawler	53.57	46.43	100.00
	Trawler-Purse seiner	83.33	16.67	100.00
	Average	<b>52.73</b>	<b>47.27</b>	<b>100.00</b>
<b>Overall average</b>		<b>51.95</b>	<b>48.05</b>	<b>100.00</b>

**Additional Table 25.** Demands of the fishermen who agree to stop fishing activities by length and type categories (%)

Length (m)		Job opportunity	Non-refundable aid	Cheap Loan	Other
< 8		67.03	6.38	9.57	17.02
8-12		82.86	2.86	0.00	14.28
12-20		41.17	17.65	23.53	17.65
20-30		10.00	-	50.00	40.00
≥30		25.00	-	75.00	-
Type of fishery					
<b>Average of small-scale (Coastal fishing) fishery</b>		<b>71.76</b>	<b>5.34</b>	<b>6.87</b>	<b>16.03</b>
Medium and large scale fishery	Purse-seiner	33.33	11.11	55.56	0.00
	Trawler	20.00	6.67	40.00	33.33
	Trawler-Purse seiner	20.00	20.00	20.00	40.00
	Average	<b>24.14</b>	<b>10.34</b>	<b>41.38</b>	<b>24.14</b>
<b>Overall average</b>		<b>63.12</b>	<b>6.25</b>	<b>13.13</b>	<b>17.50</b>

**Additional Table 26.** Future plans of the fishermen who are stopping fishing activities by length and type categories (%)

Length (m)	Plant production	Trade	Animal husbandry	Fish Farming	Secondary works relating to fishery	Other	
< 8	5.32	25.53	8.51	11.70	14.89	34.05	
8-12	5.71	28.58	5.71	5.71	20.00	34.29	
12-20	-	29.41	5.89	17.65	29.41	17.64	
20-30	-	30.00	-	10.00	40.00	20.00	
≥30	-	50.00	-	-	50.00	-	
<b>Type of fishery</b>							
<b>Average of small-scale (Coastal fishing) fishery</b>							
	<b>5.34</b>	<b>25.95</b>	<b>7.64</b>	<b>9.16</b>	<b>17.56</b>	<b>34.35</b>	
Medium and large scale fishery	Purse-seiner	-	22.22	-	22.22	55.56	-
	Trawler	-	46.67	-	13.32	26.67	13.34
	Trawler-Purse seiner	-	20.00	20.00	-	20.00	40.00
	Average	-	<b>34.48</b>	<b>3.45</b>	<b>13.79</b>	<b>34.49</b>	<b>13.79</b>
<b>Overall average</b>							
	<b>4.38</b>	<b>27.50</b>	<b>6.88</b>	<b>10.62</b>	<b>20.00</b>	<b>30.62</b>	

\* ice production, selling of fishing gear, etc.

**Additional Table 27.** Problems of fishermen regarding fisheries sector by length category (%)

Problems faced in the fisheries sector	Length (m)					Overall average
	< 8	8-12	12-20	20-30	≥ 30	
Decrease in the fish stocks due to over-fishing	84.49	80.33	73.08	83.33	50.00	81.49
Pollution of the seas and the coastal constructions	77.01	73.77	80.77	75.00	60.00	75.97
Inadequate organisation	72.19	75.41	80.77	75.00	70.00	73.70
Weak co-operative activity	67.38	77.05	80.77	66.67	50.00	69.81
Inadequate fishery policy	67.38	68.85	69.23	83.33	80.00	69.48
Roles of brokers in marketing	61.50	68.85	76.92	75.00	40.00	64.61
Unstable prices	60.96	65.57	76.92	66.67	70.00	63.96
Inadequate fisheries industry	32.62	47.54	57.69	41.67	40.00	38.64
Low consumption	31.55	36.07	73.08	29.17	50.00	36.36
Transportation problems	21.93	21.31	53.85	29.17	30.00	25.32
Short fishing period	21.93	29.51	34.62	8.33	10.00	23.05

**Additional Table 28.** Problems faced by fishermen in fisheries sector by type of fishery (%)

Problems faced in the fisheries sector	Type of fishery					Over all average
	Small-scale fishery (Coastal fishing)	Medium and large-scale fishery				
		Purse-seiner	Trawler	Trawler-purse seiner	Average	
Decrease in the fish stocks due to over-fishing	83.79	47.62	82.14	100.00	70.91	81.49
Pollution of the seas and the coastal constructions	76.68	61.90	75.00	100.00	72.73	75.97
Inadequate organisation	73.52	66.67	78.57	83.33	74.55	73.70
Weak co-operative activity	70.36	61.90	71.43	83.33	69.09	70.13
Inadequate fishery policy	67.98	80.95	78.57	50.00	76.36	69.48
Roles of brokers in marketing	63.64	52.38	82.14	66.67	69.09	64.61
Unstable prices	62.45	61.90	82.14	50.00	70.91	63.96
Inadequate fisheries industry	37.15	42.86	46.43	33.33	43.64	38.31
Low consumption	33.60	38.10	57.14	50.00	49.09	36.36
Transportation problems	22.53	33.33	39.29	50.00	38.18	25.32
Short fishing period	24.11	14.29	14.29	50.00	18.18	23.05

**Additional Table 29.** Views of fishermen on fishery regulations

Future regulations in the fisheries sector	Meaningful	Not meaningful
Prevention of the pollution of the seas	79.22	20.78
Prohibition of the fishing methods that make harm on the fish stocks	73.70	26.30
Establishment of a separate directorate general of fisheries	74.03	25.97
Make the social security widespread in fishery area	69.16	30.84
Reduce the number of fishermen in line with the fish stocks	50.65	49.35
Determine the fishing period in line with the fish stocks	54.87	45.13
Urge fish consumption through promotions and advertisements	40.91	59.09
Incentives (low tax, exemption, low interest loan, etc.)	60.39	39.61
Facilitate the importation of fishery equipment	40.26	59.74
Give importance to the training on fishing	55.20	44.80
Modernisation of shelters, ports and slips	68.83	31.17
Development of fish processing industry	39.29	60.71
Ensure price stability	59.74	40.26
Make the producer organisations and co-operatives become active	60.39	39.61
Imposition of catch quota	60.71	39.29



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