# Socio-Economic Structure of the Deep Water Pink Shrimp Fisheries in the Marmara Sea

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This research was done to be determined the socio-economic structure of shrimp fishery in the Marmara sea. The main material of this research is the original data which has been obtained by face-to-face interviewing with the vessel owners via using questionnaires during 2003-2004 shrimp fishery season. In the questionnaires the fallowing data has been taken places which are given respectively : About vessels and fishery activities: Length of vessels, engine power, construction material, fishery equipments, vessel construction place and date, the number of crew in per vessel, quantity of fishing shrimps according to the maths, fishing periods, average selling price, marketing channels. About social-economic structures vessels' owners: Vessels' owners age, beginning year of shrimp fishing, education, number and ages of family members, professions cost of shrimp fishing and gross revenues and etc., of fathers, having social security and etc. It was utilized as a demographic indicator for some fishery community's characteristics. The vessels which are taken into sample were determined by using "Strafied Random Sampling Method". There were 63 vessels calculated by using formula. Vessels were classified among three groups. In the first group it was accepted that the vessels which are smaller than 10 m were called as "small", 10-15 m were "medium" and longer than 15 m were "big". In the first group it was calculated and then into consideration for interviewing 27 vessels, in the second group 29 vessels, and into last group 7 vessels. All data were analyzed by these three groups comparatively. The research data obtained were analyzed by using Microsoft word and Excel programs. Consequently, the detailed data were summarized in the table by absolute and rational values. According to the research findings; although many problems have to be solved related with shrimp fisheries most the families could get adequate level of income thanks to this valuable sea product.

**Key words :** Deep water pink shrimp fisheries, Socio-economic structure, Marmara Sea.

## Marmara Denizi Derin Su Pembe Karides Balıkçılığının Sosyo-Ekonomik Yapısı

Bu araştırma Marmara denizinde karides balıkçılığının sosyo-ekonomik yapısını belirlemek amacıyla yapılmıştır. Araştırmanın ana materyalini 2003-2004 karides av sezonu sırasında balıkçılarla karşılıklı görüşmeler yoluyla doldurulan anket formlarından elde edilen original veriler oluşturmaktadır. Anket formlarında ağırlıklı olarak şu sorulara yer verilmiştir. Tekne ve balıkçılık faaliyetleri ile ilgili; tekne uzunlukları, motor gücü, tekne imal materyali, balıkçılık ekipmanları, tekne imal yeri ve yılı, teknelerdeki tayfa sayısı, avlanan karides miktarı, av dönemleri, ortalama satış fiyatları ve pazarlama kanalları ele alınmıştır. Tekne sahiplerinin sosyo-ekonomik yapıları ile ilgili olarak; tekne sahiplerinin yaşları, balıkçılığa başlama yılı, eğitim düzeyi, aile bireyi sayısı, karides balıkçılığı maliyetleri ile elde ettikleri brut gelir, sosyal güvenlik durumları vb. sorgulanmıştır. Örnek hacmi belirlenirken 'tabakalı tesadüfi örnekleme' yöntemi uygulanmış ve 63 adet tekne araştırma kapsamına alınmıştır. Tekne büyüklüklerine gore üç ayrı gruba ayrılmıştır. 10 m'den kısa tekneler 'küçük', 10-15 m arası 'orta' ve 15 m'den uzun tekneler 'büyük' olarak adlandırılmıştır. Buna gore 1. grupta 27 tekne, 2. grupta 29 tekne ve son grupta 7 tekne yer almıştır. Veriler söz konusu gruplar itibariyle karşılaştırmalı olarak analiz edilmişlerdir. Araştırma bulguları Microsoft Word ve Excell programları ile çizelgeler haline getirilerek mutlak ve oransal değerler şeklinde yorumlanmıştır. Araştırma sonunda, karides balıkçılığının sürdürülebilir nitelikte olabilmesi için çözülmesi gereken pek çok sorun tespit edilmesine rağmen, Marmara denizinde karides balıkçılığı ile uğraşan ailelere tatmin edici bir gelir sağladığı anlaşılmıştır.

**Anahta Kelimeler:** Derin su pembe karides balıkçılığı, sosyo-ekonomik yapı, Marmara denizi.

## Introduction

Marmara Sea, which has a typical inside sea characteristics, is placed all along the Turkish borders. Because of both intensive level of population living around and many industrial plants has been taken place at this area which has continuously environmental pollution. In addition to, intensive sea traffic due to tankers carrying petroleum and etc., have been causing this pollution to the higher levels.

Since, the all negative factors mentioned above, incredible amount of fish spices (118 different spices belonging to 10 taxonomic groups) were observed still alive in the Marmara Sea (Zengin at all., 2004). This situation causes to be gained at a satisfactory level of income for many fishery families and sustainable of their lives.

Instead of forbidden fishing period (May to August), there are several species and high quality and valuable of fish landings could be caught such as Horse mackerel, Atlantic bonito, Blue fish and etc., and its fisheries are given very important input regional and national economy.

Because of having rich sea benthic fauna, it could be giving opportunity of living source, mainly of deep water pink shrimp fisheries. The deep water pink shrimp fishing has been realizing along Mediterranean, Aegean and Marmara seas and hundreds' of fishery families have been going on their life due to this fisheries.

For the shrimp fishing are generally used dredge, traditional seine net. And in spite of forbidden deep trawl also used all around year since along time in the Marmara Sea. This last method are used much more than other in this area (Zengin at all., 2004) If the suitable fishing methods are used and effective controlling could be done by the government, both the quantity of production and export opportunities will be possible to much higher levels. Because of attractive world demand and gradually increasing domestic demand have been giving importance to this valuable sea product.

The production and export potential of Turkey is still very low level comparatively to other countries. According to the statistics about the past decade, the amount of exports have been realized is about 300-600 tons and exporting value is about 15-20 million dollars per year averagely. The main exporting countries are primarily Italy and then Lubeneon, France, Spain respectively (Çelikkale et al., 1999). The shrimps are generally marketing into five different categories such as jumbo, sub grand, medium, small and fracture. There are noticeable price differentiations among these quality classes.

It could be said that, detailed researches and necessary preventive measures should be done or taken care of for increasing population and sustainable fisheries activities of shrimps in the Marmara Sea because of higher level of economic importance both for regional and Turkish economy. It is conspicuous that, since no any research has been made in this subject; especially on socio-economic dimensions. There are only a few studies about on the stocks and fisheries (JICA, 1993; Zengin et al., 2005). With this research, it is aimed to put on both technical and economical structure of shrimp fishery because of noticeable non-existence in this area. The objective of this research is to be determined the socio-economic structures of shrimp fisheries which are located along Marmara sea coastal area. It is also argued their problems for getting higher level of living standards. And additionally its goal is to determine new strategies for more exploitation the shrimp' stocks.

## Material and Method

The main material of this research is the original data which has been obtained by face-to-face interwieving with the vessel owners via using questionnaires during 2003-2004 shrimp fishery season. In the questionnaires the fallowing data has been taken places which are given below:

About vessels and fishery activities: Length of vessels, engine power, construction material, fishery equipments, vessel construction place and date, the number of crew in per vessel, quantity of fishing shrimps according to the maths, fishing periods, average selling price, marketing channels.

About social-economic structures vessels' owners: Vessels' owners age, beginning year of shrimp fishing, education, number and ages of family members, professions cost of shrimp fishing and gross revenues and etc., of fathers, having social security and etc. It was utilized as a demographic indicator for some fishery community's characteristics (Knudsen, 1977).

The vessels which are taken into sample were determined by using "Strafied Random Sampling Method" according to the formula which is given below (Yurtsever,1984).

$$n = \cfrac{N\sum( N_hS_h^2 )}{N^2D^2+\sum N_hS_h^2}$$

n : Number of sample

N : Number of total vessels

$N_h$ : Number of vessels in each group

$S_h$ : Standart deviation of each group

$D^2$ : $d^2/Z^2$

d : Standart error of population average

Z :Z value in normal distr. table (%90)

There were 63 vessels calculated by using this formula. Vessels were classified among three groups. In the first group it was accepted that the vessels which are smaller than 10 m were called as "small", 10-15 m were "medium" and longer than 15 m were "big". In the first group it was calculated and then into consideration for interviewing 27 vessels, in the second group 29 vessels, and into last group 7 vessels. All data were analyzed by these three groups comparatively.

The application of field survey was realized along the coastal area of Marmara Sea which is: 7 applications were made in İstanbul (Tuzla), 17 in Yalova (Gemlik, Armutlu, Trilye), 6 in Bandırma (Erdek, Marmara Adası), 6 in Çanakkale (Biga) 27 in Tekirdağ (Şarköy, Hoşköy, Kumbağ and Barbaros).

Besides original data, it was benefited from the secondary data on a great scale which were obtained by the publications made from related universities, research institutions and etc. The research data obtained were analyzed by using Microsoft word and Excel programs. Consequently, the detailed data were summarized in the table by absolute and rational values.

## Results

### Characteristics of shrimp fleet

According to the strafied sampling method it was calculated 63 vessels in the research area. Due to classification the ratio of vessels which were smaller than 10 m was calculated as %42,9 (47 vessels), 10-15 %46,0 (29 vessels) and bigger than 15 m %11,7 (7 vessels) respectively (Table 1 and Table 2).

The average body length of the vessels which are defined as "small" (<10 m) were calculated as 8,31 m. Horse powers were determined range of 28-135 hp and prevalent measurements were calculated as 80-90 HP generally. Construction materials were all made on wood. Main fishery equipments such as radar (%25,9), sonar (%11,1), compass (%22,7), radiophone (%25,9), power-block (%75,6) and winch wind-lass (%92,6) were available at the mentioned ratios. The average ages of vessels were calculated as 16,3 years old and member of crew was two persons usually (%1,7 crew/vessel).

The average body-length of the vessels which were grouped in "medium" size scale were calculated as 11,65 m. Horse-powers were determined at the range of 90-145 hp. Prevalent measurements were 108-135 HP. Construction materials were made mainly by wooden base (%93,0) and %7,0 proportion of vessels made from sheet iron. Fishery equipments relatively having higher level comparatively small scaled vessels. Average vessels' age were calculated as 11,5 years old and built up relatively nearby period. The crew employed in vessels usually three persons (2,6 crew/vessel).

**Table 1.** The horse powers and constructions materials of shrimp fisheries in the
Marmara Sea

| Vessels groups (m) | Number | % | Main length (m) | Horse power (HP) Min-Max | Horse power (HP) General | Made construction (%) Wooden | Made construction (%) Metal |
|---|---|---|---|---|---|---|---|
| <-9.90 | 27 | 42.9 | 8.31 | 28-135 | 80-90 | 100.0 | - |
| 10.0-14.90 | 29 | 46.0 | 11.65 | 90-145 | 108-135 | 93.0 | 7.0 |
| 15.0-< | 7 | 11.1 | 16.60 | 205-410 | 300-350 | 28.6 | 71.4 |
| Total | 63 | 100.0 | - | - | - | - | - |
| Average | - | - | 10.77 | - | - | 88.8 | 11.2 |

**Table 2.** The fishing equipments, vessels age and crew numbers of shrimp fisheries in the
Marmara Sea

| Vessels groups (m) | Number | % | Fishing equipments (%) Radar | Sonar | Compass | Radiophone | Power-block | Gear windlass | Main vessel age | Main number of crew |
|---|---|---|---|---|---|---|---|---|---|---|
| <-9.90 | 27 | 42.9 | 25.9 | 11.1 | 22.7 | 25.9 | 92.6 | 75.6 | 16.3 | 1.7 |
| 10.0-14.90 | 29 | 46.0 | 55.2 | 13.8 | 55.2 | 65.5 | 82.8 | 82.8 | 11.5 | 2.6 |
| 15.0-< | 7 | 11.1 | 85.7 | 42.9 | 85.7 | 100.0 | 100.0 | 100.0 | 9.7 | 3.4 |
| Total | 63 | 100.0 | - | - | - | - | - | - | - | - |
| Average | - | - | 46.0 | 15.9 | 43.1 | 42.4 | 88.9 | 81.6 | 13.4 | 2.3 |

It was determined that the average length of big vessels (<15 m) was calculated as 16,60 m and horse power was range over 205-410 HP usually prevalent power of engines preferred were 300 and 350 HP. The vessels were usually made from sheet-ironed construction material (%71.4) and wooden based of vessels were relatively low level (%28,6) Main and necessary fishery equipments were available with in all vessels and generally radar system have been preferred instead of sonar in most of the vessels in the research area. The vessels were 10 years old as an average (9,7 years) and crew employed 3-4 (3,4 crew/vessel) generally.

**Demographic structure of the fisherman**

**1. Age distribution:** Demographic situations of vessel-length groups are given detailed in Table 3. As it is shown in the table, the shrimp fisheries into small group were 46.0 years old averagely. Medium group 42,8 years old and the youngest group was calculated at 40,6 years old into big group. Average years old of beginning shrimp fishing was found the latest in "small" group (26,6 years old), 16,3 in "medium" and 14,4 in "big" group.

**Table 3.** Demographic structure of vessels' owners according to the vessel-length groups (%)

| Vessel groups | Average age | Starting of the working age | Education level | | | Family population | Occupation origin | | | Insurance situation | Rate of shrimp income into total (%) |
| | | | Primer school | Middle school | High school | | Fisherman | Framer | Worker | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <-9.90 | 46.0 | 26.6 | 55.6 | 22.2 | 22.2 | 4.1 | 33.3 | 51.8 | 22.2 | 33.3 | 78.6 |
| 10.0-14.90 | 42.0 | 16.3 | 82.8 | 10.3 | 6.9 | 4.4 | 58.6 | 24.1 | 17.2 | 48.3 | 57.2 |
| 15.0-< | 40.6 | 14.4 | 100.0 | - | - | 5.7 | 71.4 | 28.6 | - | 71.4 | 42.8 |
| Average | 43.9 | 20.5 | 73.1 | 14.3 | 12.7 | 4.4 | 49.2 | 36.5 | 14.3 | 44.4 | 64.8 |

It was determined that the reason of why the fishermen have been beginning in late period of age, could be said that they have been chosen this kind of activity as the second profession. Average age of beginning fishery profession was determined as fallows; 26,6 in the small group which is the latest age average among the others; 16,3 in medium and 14,4 in the biggest group. In the small group most of the fishermen have been engaged with other professions such as farming, industrial worker, driving and etc., before choosing shrimp fishery activities. On the other hand, the fishermen who are in higher groups have been interested in a long year with fisheries because of their fathers' profession and learning fishery relatively at younger periods.

**2. Education level:** About the education levels, it was determined that there were an indirect relationship according to the bigness of shrimp fishery groups. However, the fishermen being into biggest group, they all educated only to an elementary school level. In the smallest group the vessel owners have been relatively higher educated [junior and senior high school education at the same level (%22,2)].

**3. Occupational origin:** The numbers of household of vessels' owners have been increasing according to bigness of groups. It could be said that about the reason of this, because of fathers' profession they are living and gathering big household all together. If it is examined the fathers' profession of the vessel owners, it was understood that noticeable number of them have been gained their livelihood by fishery occupations which was calculated as %33,3, %58,6 and %71,4 respectively. The other professions were determined mainly, farming and industrial working activities.

**4. Social insurance:** Having social insurance level has been increased gradually toward higher groups. Since many fishermen are not member of any social insurance yet.

**Table 4.** The quantity of shrimp fishing, selling prices, average income and marketing channels according to the vessels' groups

| Vessels lengths groups | Amount of shrimp landing | Fishing period (Day) | Total kg/year | Price €/kg | Average income (€) | Marketing channels (%) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Vessels | Wholesalers | Cooperatives |
| **<-9.90** | 24.6 | 114 | 2804 | 1,9 | 5239,5 | 12.5 | 82.7 | 4.8 |
| **10.0-14.90** | 27.3 | 126 | 3440 | 2,0 | 6742,4 | 14.6 | 73.0 | 12.4 |
| **15.0-<** | 32.2 | 167 | 5478 | 2,2 | 12020,3 | 16.3 | 69.2 | 14.5 |
| **Average** | 26.8 | 125 | 3.394 | 1,9 | 6607,6 | 13.9 | 76.7 | 9.4 |

### Landing, incomes and sales

The ratio of shrimp fishery income in total income it was calculated that the main income of small vessel owners have been getting by shrimp fishing on a great scale (%78,6). The ratio mentioned relatively low into higher groups.The quantity of shrimp fishing, selling prices, average income and marketing channels according to the vessels' groups are shown at the Table 4. Small vessels (<10 m) could be fishing 24,6 kg shrimps per day along the fishing season averagely. This quantity was 27,3 kg and 32,8 kg into other groups

Consequently, it was calculated that average income was realized as €5.239, €6.742 and €12.020 respectively. Mentioned incomes are related with only for shrimp fishing activities. Besides shrimps, many other fish spices could be catching at the same time and the incomes from those are, should be added to "Gross Production Value" for each group.

Fishermen are usually had to be sold their products to the wholesalers because of credit relationships with each others. Just as small vessels' owners have been selling their products to the wholesalers because of credit relationship with each others. Just as small vessels' owners have been selling their products to the wholesalers on a great deal (%82,7) due to mutual agreements. Some of the shrimps were sold on the vessel to the inquiring persons and the restaurants at satisfying price level. However, this kind of selling is made without permission and unrestricted. The selling respectively. Fishing period could be changing according to the weather conditions and lengths of vessels. Fishing season are same for all regions in the Marmara Sea. During fall and winter shrimp activities are done intensively, but there is forbidden in summer times. Big vessels could be fishing much more days relatively other groups (167 days). In addition to, they could getting higher prices during unsuitable weather conditions because of less quantity of catch shrimps (2,19 €/kg). Small vessels could get lower prices at the ratio of %17,4 relatively.

through cooperatives is done only in some regions and less quantities.

### Operating inputs and costs

**1. Fuel oil:** The average variable costs, gross production value and gross profit are shown detailed in the Table 5. As it is shown in the table, the cost of fuel oil is the highest in all groups. The vessels are generally move for shrimp fishing in the early morning and turn back during 13.⁰⁰-14.⁰⁰ at noon. Average fishing period is generally 5-6 hours per day. In this period the small vessels consume 22,3 lt/day fuel oil and the other groups 31,6 lt/day, 40,5 lt/day respectively. During the research period the average fuel oil price was about 0,74 €/lt. Therefore the small vessels have been consumed nearly €1.888,5 of fuel oil in full season (114 days). The values for medium and big groups were calculated as €2.958 and €5.024 respectively.

**Table 5.** The average variable costs, gross production value and gross profit according to vessels' length groups (€)

| Fishery Costs | Vessels' lengths groups | | |
|---|---|---|---|
| | **< 9.90** | **10.0-14.90** | **15.0 <** |
| Fuel-oil cost* | 1888,5 | 3529,2 | 5024,3 |
| Vessel repair | 391,4 | 702,9 | 1037,1 |
| Net repair** | 257,1 | 257,1 | 257,1 |
| Crew wages*** | 985,6 | 727,8 | 1028,8 |
| Package and wooden case | - | - | - |
| Ice cost | - | - | - |
| Provisions expenses | himself | himself | himself |
| Marketing costs | - | - | - |
| Deduction from a sum of sales | - | - | - |
| Seaport allowances | - | - | - |
| Paying a fine for forbidden fishing | - | - | - |
| Deduction of cooperatives (%2) | 104,8 | 134,8 | 240,4 |
| **Total costs (€)** | 3627,4 | 4780,4 | 7587,8 |
| **Common costs (€)** | 371,8 | 490,0 | 777,8 |
| Assorted expenses (Total cost)* 0.05 | 181,4 | 239,0 | 379,4 |
| Management cost (Total cost + Assorted expenses)* 0.03 | 114,3 | 150,6 | 239,0 |
| Capital interest (Total cost+ Assorted expenses)* 0.02 | 76,2 | 100,4 | 159,3 |
| **Total variable cost (€)** | 3999,2 | 5270,5 | 8365,6 |
| **Catch of shrimp amount (kg)** | 1602,3 | 1965,7 | 3130,3 |
| **Production cost of shrimp (€/kg)** | 1426,3 | 1532,1 | 1527,1 |
| **Selling price of shrimp (€/kg)** | 1,868,6 | 1,960,0 | 2,194,3 |
| **G.P.V. of shrimps (€)** | 5238,9 | 6742,4 | 12020,3 |
| **G.P.V. of other fish spices (€)** | 781,7 | 1224,0 | 2004,0 |
| **Total G.P.V. (€)** | 6020,6 | 7966,4 | 14024,3 |
| **Gross income (€)** | 2021,9 | 2696,0 | 5658,7 |

* Fuel-oil cost: Small 22.3 lt/day; middle 31.6 lt/day; big 40.5 lt/day, 1 lt fuel-oil : € 0,74
** Net repair cost: 30 package/year; 1 package: € 8,6
***Crew Wages (x) : Total income–(Fuel-oil+%50 vessels' share)= x / crews number

**2. Repairing:** Repairing costs of vessels were determined as fallows: € 391 in small group; €703 in medium and €1.037 for in biggest group. Repairing of fishing nets usually not done and replacement has been occurred. Fishermen have been bought nearly 30 package of fishing nets in whole year averagely. The price of per net was about € 8,6 and €258 totally. This cost was accepted for same value in all groups.

**3. Wages:** The wage system for fishery work power (crew) is quite different from other field of business. In other words, the crews which are working in the vessels have not an orderly income. It is changing directly the amount of shrimps catch. That is to say; total revenue of shrimp sales–(fuel oil+vessel share%)=x/crew numbers ( **x : crew wages)**

**4. Packaging and ice expenditures:** In shrimp fishery the products have been bought by the wholesalers immediately which have been waiting the vessels at the seaports, there is not any cost of packaging and ice expenditures.

**5. Daily food:** Field rations (food) are not accepted as the cost generally. The food eaten in the vessel usually has been bought together and the expenditures shared among crew.

**6. Cooperative deductions:** In addition to, the share of %2 out of total revenue of shrimps has been deducted by the fishery cooperatives.

**7. Punishments:** During forbidden fishery period, noticeable punishments have been applied due to criminal laws. It could not get sufficient replies by the fishermen about this subject.

However, these kinds of cost have been taken into consideration under the "Variable Costs" prescience a formula mentioned in the Table 4. Also, the costs of management and capital interest were calculated according to the similar formula. All of the costs listed in Table 4 could be defined as under the title of "Variable Costs". Variable costs have been calculated among the groups which are €3.999, €5.270 and €8.366 respectively.

**Analyses of profitability**

According to the calculations mentioned above, it was determined that the cost of 1 kg of shrimp are as fallows: €1,43, €1,53 and €1,53. If the average selling prices are taken into consideration there are no money loss in shrimp fishery and could be said that a sufficient income provided by this commercial activity.

If it is taken into consideration the values of other fish species catch within shrimps, the gross production value (GPV) was calculated among groups are as fallows: €6.021, €7.966 and €14.596 respectively.

The "Gross Margin" Which is the difference between gross production value and variable costs which were determined as €2.022 in small fishery vessels, €2.696 in medium group and €5.659 in biggest group. These values are comprised along 6 months of shrimp fishery season. However, this level of income for this period if it is sufficient or not, is another subject could be discussed.

Consequently, the powerful and effective efforts should be done to be sustainable in Marmara Sea for increasing population and getting sufficient income to the fisheries.

**Discussion**

According to the results of the research, it was calculated that shrimp fishery activities have been getting satisfactory revenue to the fishermen. Since, many problems have been faced still on a noticeable levels due to variable factors.

*The problems faced in shrimp fishery and offered suggestions to these problems are given below :*

The revenue is low level because of higher fishery costs (%73.0), unharmoniesness of forbiddens (%28.5), uncertainaties of fishery

areas(%9.5), limitation of shrimp fishery(%9.5), blockaging of troll kind fishery(%19.0), gradually decreasing fishing amount (%42.8), obligatoriness of fishing deeper sea levels (100-150 fathoms) (%6.3), manyat method causes to be decreasing shrimp fishing amount (%9.5), incresing amount of shrimp fishing, decreasing prices and income (%60.3), shrimp fishing gradually decreasing up to 100 fathoms (%6.3), jumbo type shrimp has not been noticeable amount in Marmara sea (%14.2), forbiddens have been applied without noticeable the specialities of regions (%19.0), manyat method causes to be destroyed shrimps and lowered prices (%9.5), forbiddens are applied during december-february period although intensive fishing opportunity(%23.8), algarna method causes to be destroyed shrimps shelters (%14.2), the number of vessels engaged with shrimp fishing are too much out of necessity (%9.5), the price balance is very low with in shrimps and fuel oil prices (%53.9), technical levels of vessels cause to be unfair competition (%19.0), shrimp prices and income level are relatively low according to life standards (%11.1), trol and lamb usage in shrimps fishing cause to be lowered catching amount (%9.5).

*The suggestions are given respectively to the mentioned problems :*

Gemlik gulf should be leaving free for shrimps fishing(%12.6), cheaper fuel oil should be provided by the government (%53.9), it should be given permission for fishing during may (%19.0), long-term decisions should be taken care of about fishing methods (%9.5), the prices could be increasing if the export amount would be increased (%28.5), shrimps fishing could be developed just as scientific researchs should be taken care of (%11.1), fishing amount of shrimps could be increasing even if the clearness level of marmara sea increased (%34.9), jumbo type of shrimps should be leaving free in karabiga and erdek gulfs (%14.2), the forbiddens used should be divided by regions; not all marmara sea at the same time (%9.5), shrimps fishing should be lowered to 50 m deep (%6.3), fishing activities should be forbidden during December-February period (%23.8), algerna fishing method which has been destroyed shrimps shelters must be changed (%14.2), the cooperatives should be bought the shrimps if the selling prices have

been dropped under fishing costs (%6.3), an organization should be developed similar to cut flowers' auctions, while marketing of shrimps (%6.3), the forbidden shrimp season applied already, should be continued (%28.5), a limitations should be applied daily catced shrimps amount (%22.2), the fishing period of december 15-january 15 should be prevented, but may leaving free (%34.9), fishing methods of using by trol and lighting should be prevented (%9.5), a limitation of number of vessels should be realized according to the fishing capaties of the regions (%9.5)

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