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Menba Kastamonu Üniversitesi Su Ürünleri Fakültesi Dergisi 2020; 6(1): 6-17 Araştırma Makalesi/Research Article

STATUS OF INLAND FISHERIES ACCORDING TO FISHERMEN OF MANISA AND ISPARTA FISHING GROUNDS*

Manisa ve Isparta Avlak Sahaları Balıkçılarına Göre İç Su Balıkçılığının Durumu

Emre YILMAZ[1]**, Serap PULATSÜ[2]

[1]Republic of Turkey Ministry of Agriculture and Forestry, Salihli District Directorate of Agriculture and Forestry, 45300, Manisa, Turkey
[2]Ankara University, Faculty of Agriculture Department of Fisheries and Aquaculture, 06100, Ankara, Turkey

*This study is a part of Emre Yılmaz's doctoral thesis.
****E-posta:** emrey45@gmail.com

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Abstract

This study aims to identify the differences between the opinions/thoughts of the fishermen who have different socio-demographic and socio-economic (age, education, income level, income sources) backgrounds in four fishing grounds: Marmara Lake, Demirköprü Dam Lake (Manisa), Egirdir Lake and Beysehir Lake (Isparta) on the following issues: a) Suggestions about overfishing b) The most important development they have witnessed in the last ten years c) The most negative development they have witnessed in the last ten years. For this purpose, the survey data obtained from 59 fishermen in 2018 were evaluated using non-linear canonical correlation analysis.

According to the findings of the research: a) Fishermen who are literate and primary school graduate, generate an annual income of 25,000-50,000TRY from fishery, earn their living by fishery and fishery+agriculture+non-agricultural activities think that there is no overfishing in the lake/dam lake they fish. However, those with a higher educational level, earning their living by fishery+agricultural activity are of the opinion that there is overfishing in the fishing grounds. None of the fishermen favor the suggestion about a quota sharing or closing the lake/dam lake to fisheries against overfishing. b) The fishermen between ages 30-45 who have an annual fishing income less than 25,000TRY and earn their living by fishery+agriculture+non-agricultural activity think that the most important development in fishery in the last ten years has been the increase in the length and amount of the product, while those who are older but have a lower level of income and education are of the opinion that the most important development in the last ten years has been the improvements in legal regulations. c) According to fishermen who are secondary/primary school, high school, vocational high school, or university graduates and earn their living by fishery+agricultural activity, the most negative aspect they have witnessed in the last ten years has been the decrease in the length and amount of the products, while those with an annual income less than 25,000TRY, who earn their living by fishery+agriculture+non-agricultural activities state that the most negative development in the last ten years has been the environmental problems.

These findings are thought to guide the fisheries management plans and decisions regarding the fishing grounds.

Öz

Bu çalışma, Marmara Gölü ve Demirköprü Baraj Gölü (Manisa) ile Eğirdir Gölü ve Beyşehir Gölü (Isparta) olmak üzere dört avlak sahasında faaliyet gösteren; farklı sosyo-demografik ve sosyo-ekonomik yapıya (yaş, eğitim, gelir seviyesi, gelir kaynakları) sahip balıkçıların, balıkçılığa ilişkin bazı konular hakkındaki görüş/düşünceleri arasındaki farklılıkların tespitine odaklanmıştır. Bu konular: a) Aşırı avcılık konusundaki önerileri b) Son on yılda balıkçılıkta gördükleri en önemli gelişme c) Son on yılda balıkçılıkta gördükleri en önemli olumsuzluktur. Bu amaçla 2018 yılında 59 balıkçıya uygulanan anket verileri, doğrusal olmayan kanonik korelasyon analizi kullanılarak değerlendirilmiştir.

Araştırma bulgularına göre: a) Okur-yazar-ilkokul mezunu, balıkçılık yıllık geliri 25.000-50.000 TL arasında olan, geçimini balıkçılık ve balıkçılık+tarım+tarım dışı gelirden sağlayan balıkçılar, avcılık yaptıkları göl/barajda aşırı avcılık yapılmadığı düşüncesine sahip iken, eğitim düzeyi daha yüksek ve geçimini balıkçılık+tarımsal gelirden sağlayan balıkçılar, aşırı avcılık yapıldığı görüşünü benimsemişlerdir. Tüm balıkçılar, aşırı avcılık konusunda kota paylaşımı yapılması ve gölün/barajın avcılığa kapatılması şeklindeki önerilere sıcak bakmamaktadırlar b) Son on yılda balıkçılıktaki en önemli gelişmeye ilişkin görüşler; 30-45 yaş arasında, balıkçılık yıllık geliri 25.000 TL altında olan ve geçimini balıkçılık ve balıkçılık+tarım+tarım dışı gelirden sağlayan balıkçılara göre ürünün boy ve miktarının artması, yaşı ileri ancak eğitim ve gelir seviyesi düşük olan balıkçılara göre ise yasal düzenlemelerin iyileştirilmesidir c) Son on yılda balıkçılıktaki en önemli olumsuzluğun; ortaokul/ilköğretim, lise ve meslek yüksekokulu-üniversite mezunu olan, geçimini balıkçılık+tarımsal gelirden elde eden balıkçılar, ürünün boy ve miktarındaki azalma, yıllık geliri 25.000 TL altında olan ve geçimini balıkçılık+tarım+tarım dışı gelirden sağlayan balıkçılar ise çevresel sorunlar olduğu görüşündedirler.

Bulguların, avlak sahalarında geleceğe yönelik balıkçılık yönetim planlarının yapılmasına ve kararların alınmasına ışık tutacağı düşünülmektedir.

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INTRODUCTION

Fishery has provided food source for mankind as well as employment and economic opportunities from past to present. As fishing is an economic resource for national economies, most of the fishery resources have been endangered by overfishing. The development of fishing technology and the fall in prices have been effective in the destruction of fishery resources worldwide. Many states in the world have begun to strive to improve fishery resources and fishery, which have been destroyed for the mentioned reasons. In order to conserve the fishery resources, fishery management authorities have begun to adopt policies regarding the control of fishery effort rather than amount (Franquesa et al., 2001; Sabatella and Franquesa, 2004).

The geographical scale of inland fisheries may range from small ponds to large rivers and lake systems. Turkey has a significant potential in terms of inland waters used as sources of food, income and employment.

"The Communiqué on Regulation of Commercial Fishery No. 4/1 (Anonymous 2016)" within the "Fisheries Law", which is in force in Turkey, involves regulations regarding inland commercial fishery. In the regulations regarding the inland waters, an approach similar to those applied in the seas is followed. In fishing bans, time and place bans are taken as a basis. A minimum length for fishing is determined for the species to be fished in inland waters and some special regulations are brought for the species with economic importance apart from the time closures brought taking into consideration their spawning periods. There are also some regulations regarding the equipment (for instance, ban on the use of seine and trawling nets, permitted use of drag-net trawls only for atherina and whether other nets can be used is determined by the Ministry's Provincial Directorates).

According to data collected in 2018, the total aquaculture production in Turkey was 628,631 tons, 314,094 tons of which was obtained through fishing and 314,537 tons through farming. The production through fishing was reported as 283,955 tons in seas and 30,139 tons in inland waters. The amount of inland aquaculture obtained by fishery was 227 tons in Manisa Province and 997 tons in Isparta Province (Turkish Statistical Institute, 2018).

There are studies on fishing efficiency and socio-economic analysis of fishermen in the fishing grounds in both provinces, which are important in terms of inland fisheries. As part of this research, our purpose was to illuminate the differences between the opinions/thoughts of fishermen of differing socio-demographic and socio-economic statuses who fish in Marmara Lake and Demirköprü Dam Lake (Manisa Province) and Eğirdir and Beyşehir Lakes (Isparta Province) in regard to the some important issues about fisheries in those four areas. To this end, the study focused on the views of fishermen of different ages, education levels, income levels and income sources on three main topics in fisheries management using the Non-Linear Canonical Correlation Analysis

(NLCCA) method: a)Their recommendations regarding overfishing, b)Their thoughts on the most significant development in fisheries in the past ten years, c)Their opinions regarding the most significant negative development in fisheries in the past ten years.

MATERIAL AND METHOD

The main material of the research is constituted by the data obtained from the surveys conducted with fishermen engaged in fisheries activities in Marmara Lake and Demirköprü Dam Reservoir (Manisa province) and Lake Egirdir and Beysehir (Isparta province), who are members of the aquaculture cooperative and boat owners registered in the "Aquaculture Information System". In the first stage, a total of 794 fishing boats were determined in the provinces based on Turkish Statistical Institute data. In the second stage, based on the population obtained, the number of boat owners to be interviewed was determined according to the simple random sampling method. The sample number was calculated as 59 using the simple random sampling formula reported by Çiçek and Erkan (1996). The fishing grounds studied are shown in Figure 1.

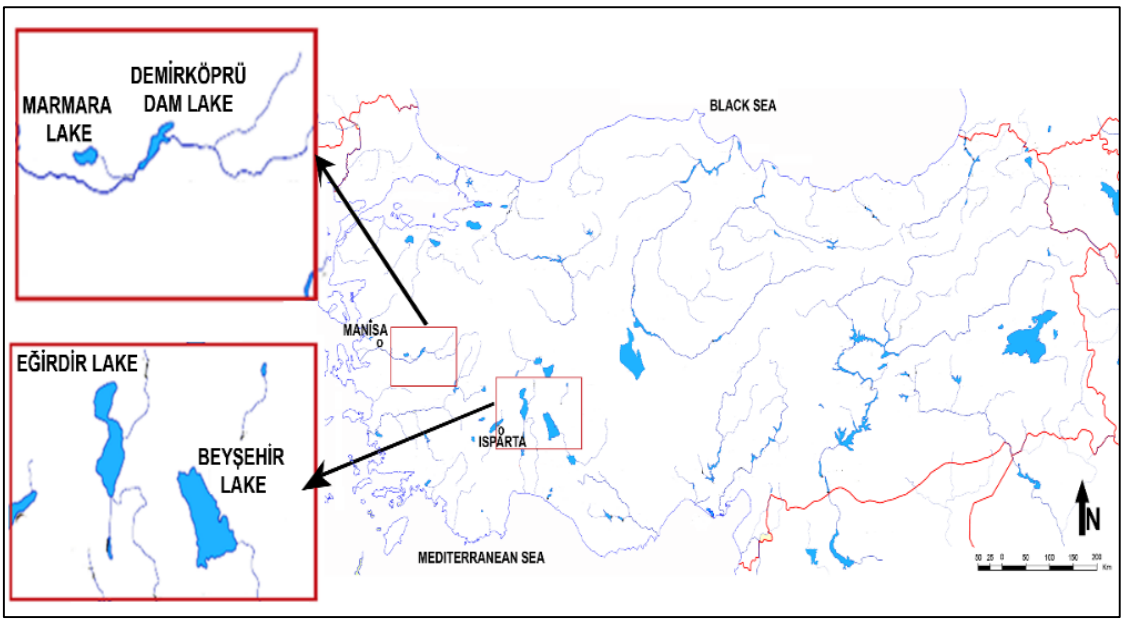

Figure 1. The location of fishing grounds

According to the weighted average of the provinces in the population, the sample (fisherman) number to be surveyed was calculated as 8 in Manisa Province and 51 in Isparta Province. The data were gathered through the interviews with fishermen owning boats. The surveys were conducted within the fishing season in 2018. "Nonlinear Canonical Correlation Analysis (NLCCA)" method, the principals of which were given in the studies by Özer and Özden (2013), Köksal and Cevher (2015) and Yavuz et al. (2015), was used in the statistical analysis of the survey data as data did not show a normal distribution. The canonical correlation coefficient is not seen after analysis, and canonical correlation is calculated according to the formula below, as reported by Özer and Özden (2013). In the NLCCA application results, there is no test value other than the canonical correlation coefficient.

The results of NLCCA analysis have no test value other than finding the canonic correlation coefficient:

Canonic Correlation = [(Set Number * Eigenvalue) – 1) / (Set number – 1)]

The list of variables and optimal scaling levels are shown in Table 1.

Table 1. List of variables and optimal scales

Set	Optimal scaling and level	Category
1	Education	Primary school
	(Ordinal)	Secondary school
		High school
		University
1	Income sources	Fisheries
	(Multiple nominal)	Fisheries+agricultural income
		Fisheries + agricultural income + non-agricultural income
1	Annual fishing income	< 25.000
	(thousand TL) (Ordinal)	25.000-50.000
1	Age	30-45 years
	(Ordinal)	46-65 years
		65+ years
2	Overfishing measures	To bring quota
		To reduce the number of vessel
		Quota sharing
		To close the lake for fishing
		No overfishing
2	The most important	To improve legal regulations
	development in fisheries	Increasing the length and quantity of the fish
		Improving marketing
2	The most negativeness	Reduction of the length and quantity of the product
	in fisheries	Inadequate legal regulations and non-compliance
		Cost and marketing shortage

RESULTS AND DISCUSSION

The results are presented in Table 1 under five main headings based on the list and the variables determined by the scaling levels. Using the NLCCA method, the fishermen' ages, education, income from fisheries, and income sources (Set 1) and variables which differ according to the contents of each heading (Set 2) were taken as a base. In the table under each heading, the average loss value for the first and second dimensions is indicated, along with the relevant correlation amount. Since the highest possible value for compliance in the analysis was 2, the compliance values under each heading are within the acceptable range (Table 2-4). Additionally, the component loadings of the variables for each heading are presented in graphic format (Figures 2, 4 and 6). It is expected that the variables in the graphs will be as far as possible from the origin, as the further from the origin, the higher the significance of the variables. The graphic presentation of the study's focus categories (Table 1) is presented in Figures 3, 5 and 7.

a) Fishermen' recommendations regarding overfishing

In Table 2, the compliance values for the NLCCA sets that were used to determine the recommendations of the fishermen regarding overfisheries according to their age, education and income are presented. In Figure 2 it can be seen that there is a strong correlation between education and the view that there is no overfishing.

Table 2. Compliance values for analysis

		Dimension		Sum
		1	2	
Loss	Set 1	0.207	0.362	0.570
	Set 2	0.207	0.363	0.570
	Mean	0.207	0.363	0.570
Eigenvalue		0.793	0.637	
Fit				1.430

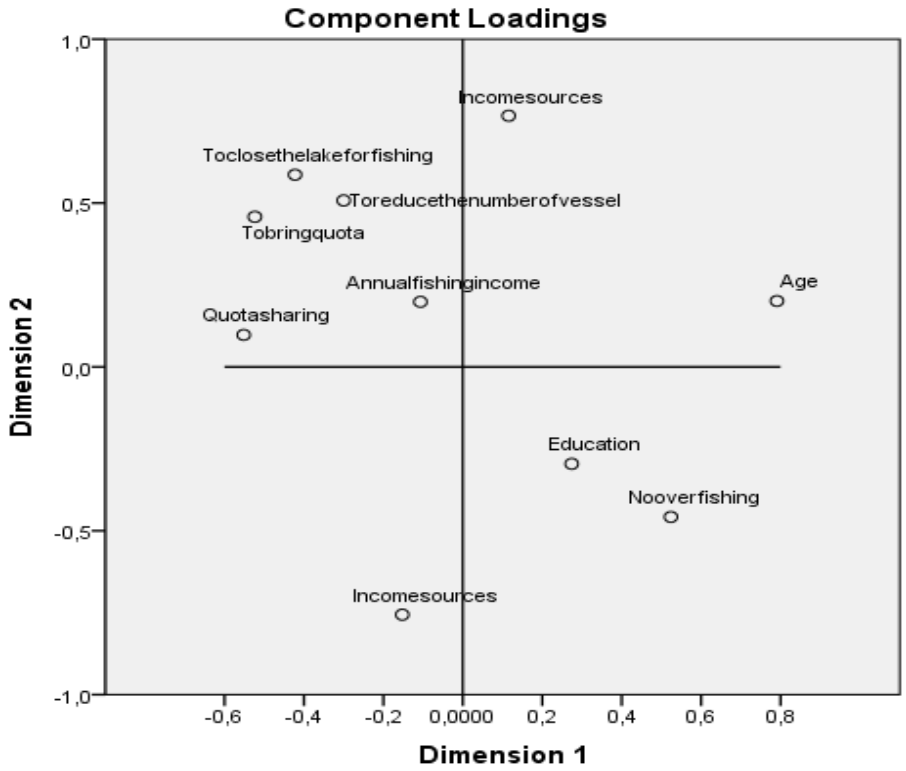

Figure 2. Graphical representation of component loads of the variables

In examining the graph showing the categories of the variables, it is clear that the categories fell into two homogeneous groups. The first group was made up of 30-45 and 46-65 year-old literate elementary school graduates whose annual income from fisheries was between 25,000-50,000 TRY, and who supported themselves only from fisheries or from fisheries+ agriculture+ other sources. These fishermen believed that the lake/dam lake where they fished was not overfished, and did not recommend measures such as closing the lake to fisheries, sharing quotas or introducing quotas; however, they did recommend reducing the number of fisheries boats. The members of the second group were graduates of middle school, high school, trade school or university who supported themselves by fisheries+farming. These fishermen were of the opinion that the lakes/reservoirs where they fished were overfished, and recommended that quotas be imposed, but not that the number of fisheries boats be reduced. None of the fishermen recommended quota sharing to prevent overfishing, nor did they recommend that the lakes/dam lake be closed to fisheries. It can be noted that the fishermen older than 65 had no opinion on the topic of overfishing (Figure 3).

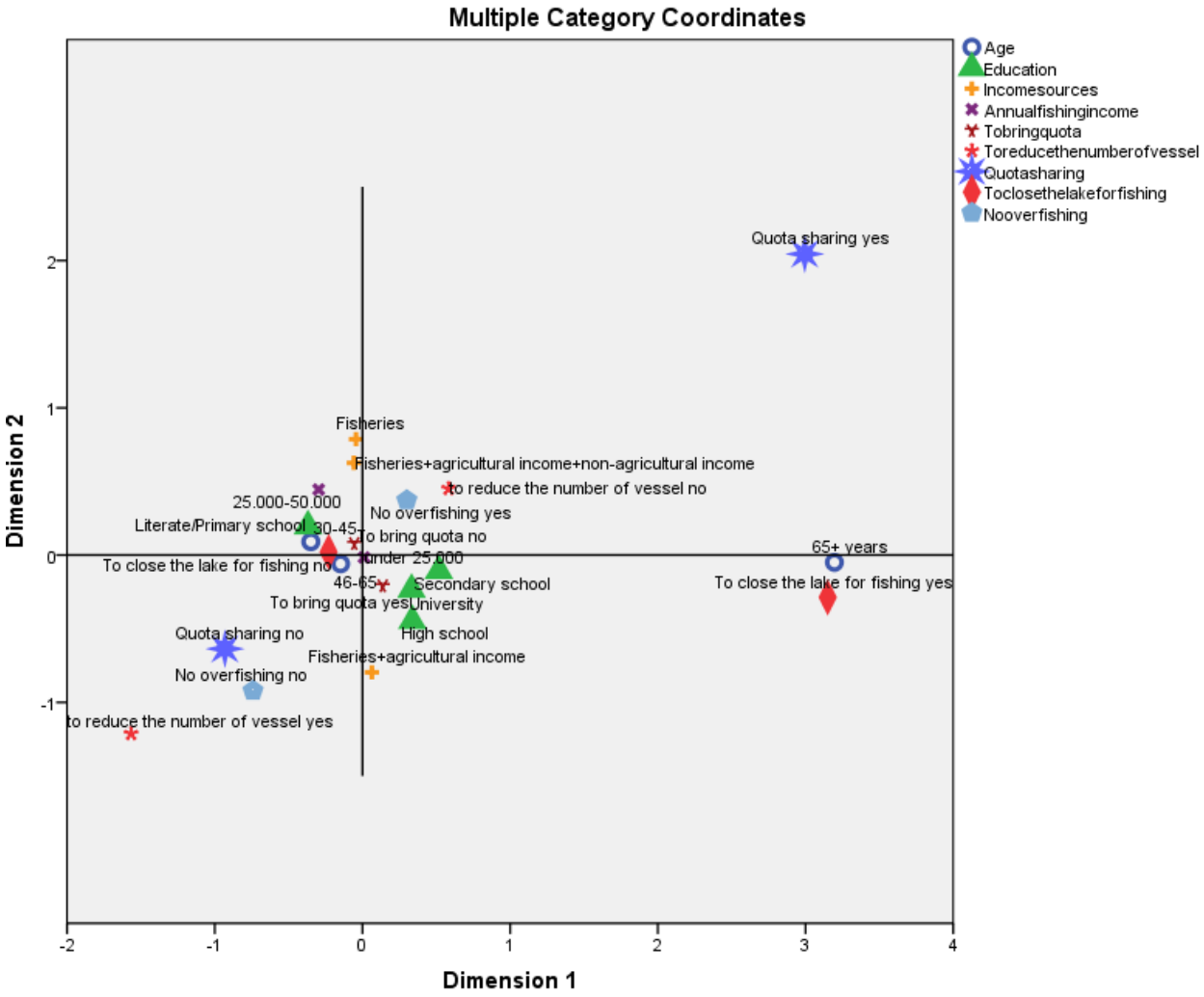

Figure 3. Graphical representation of the categories of variables

b) Fishermen' thoughts on the most significant development in fisheries in the past ten years

Table 3 presents the compliance values for the NLCCA sets that were used to determine the fishermen' views on the most significant development in fisheries in the past ten years according to their age, education and income. In Figure 4 it can be understood that there is a strong correlation between the most significant variables of income source and education, the fishermen' age, and their yearly income, with regard to their opinions on the past ten years' most significant fisheries developments.

Table 3. Compliance values for analysis

		Dimension		Sum
		1	2	
Loss	Set 1	0.082	0.119	0.201
	Set 2	0.083	0.123	0.205
	Mean	0.082	0.121	0.203
Eigenvalue		0.918	0.879	
Fit				1.797

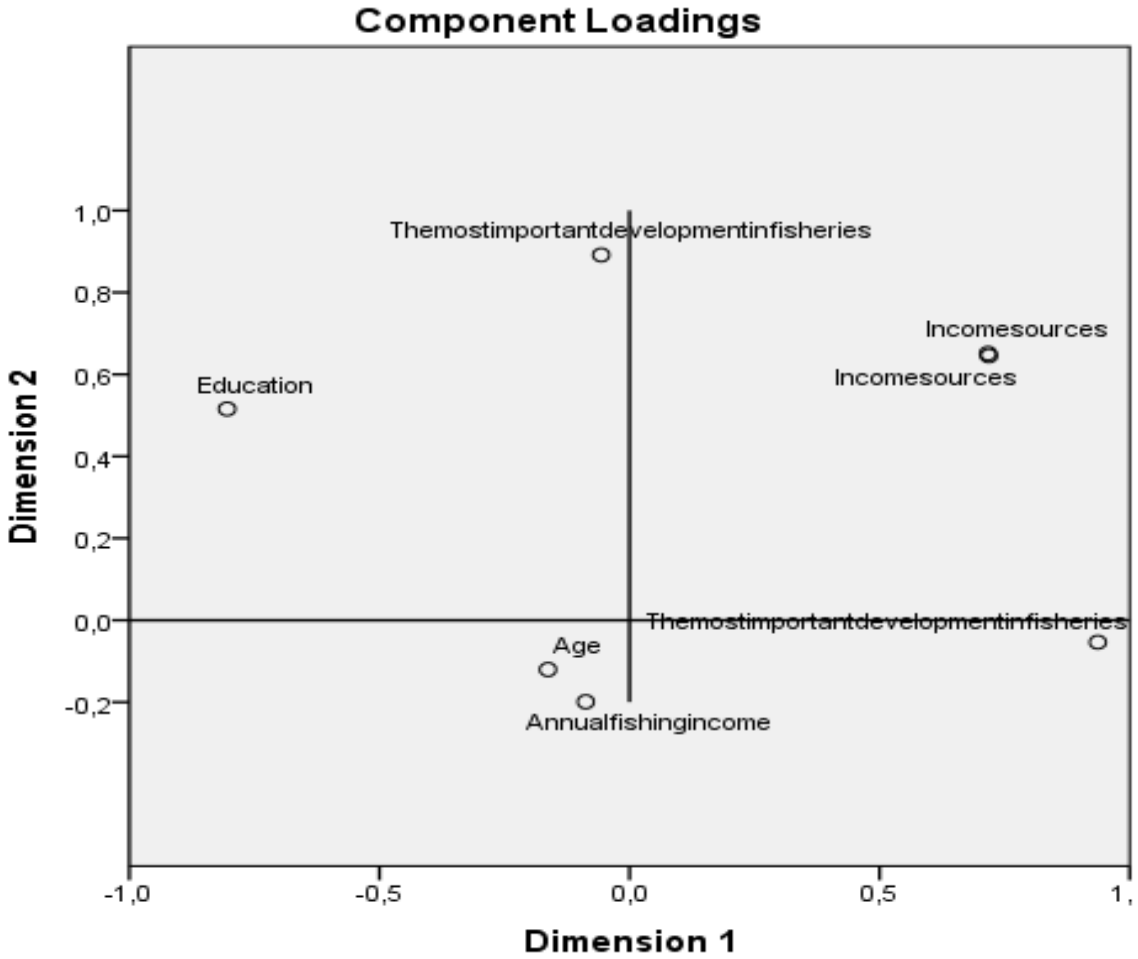

Figure 4. Graphical representation of component loads of the variables

When examining the graph showing the categories of the variables, it was noted that the categories made up two homogeneous groups. According to the fishermen in the first group, who were between 30-45 years of age, had an annual fisheries income of less than 25,000 TRY, and supported themselves through fisheries+farming+non-farming income, the most important development of the previous ten years in the fisheries was the increase in the size and number of fish. As for the fishermen in the second group, who were literate middle school or high school graduates between 46-65 and 65+ years old whose annual income from fisheries was b between 25,000-50,000 TRY and who supported themselves through fisheries+farming, the most significant development in the fisheries over the last ten years was the improvement of regulation. Fishermen who were trade school or university graduates indicated that there had been no significant development in the fisheries in the last ten years. It was determined that none of the fishermen believed that improvements in marketing of fish was a development that had been witnessed during the last ten years (Figure 5).

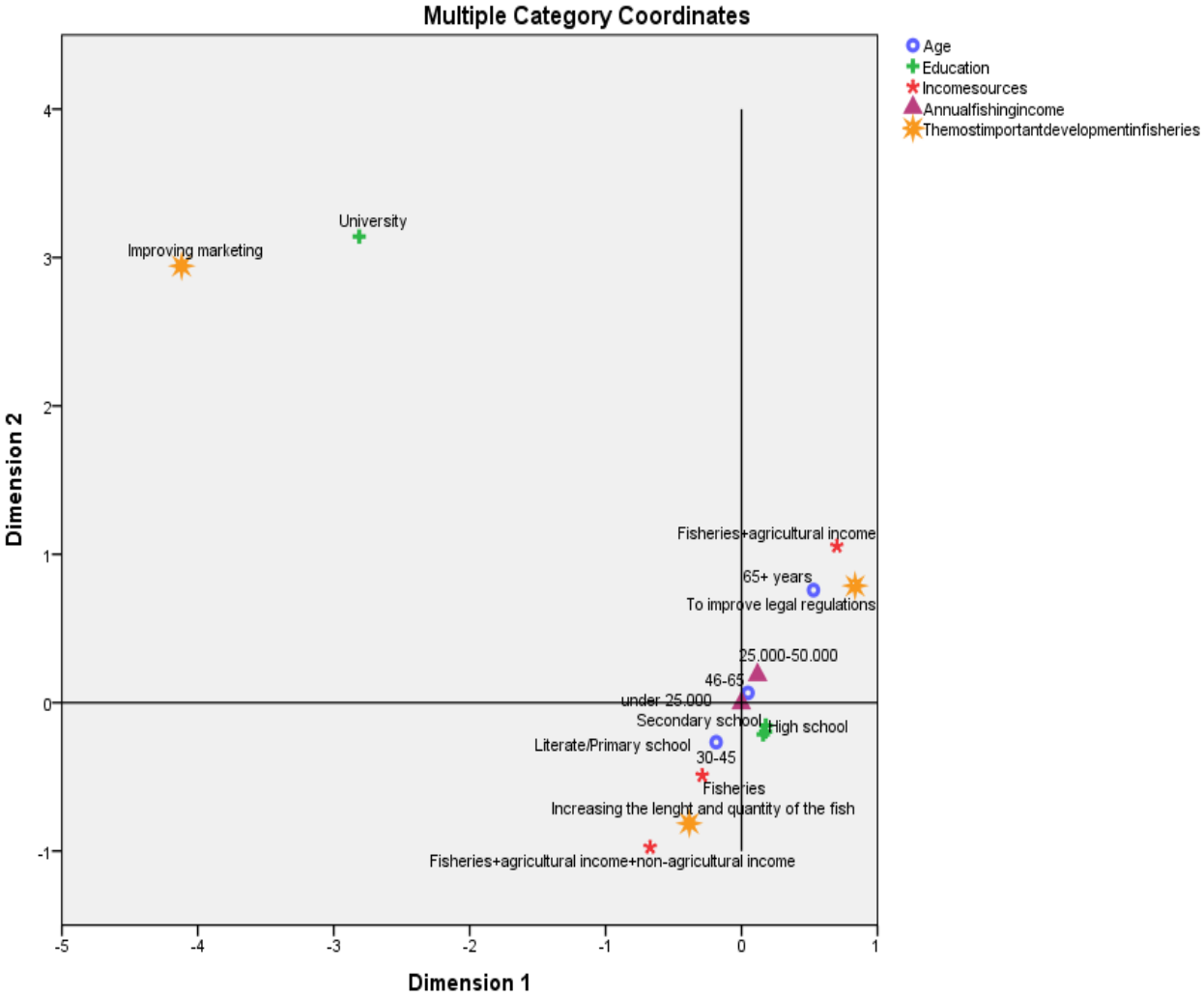

Figure 5. Graphical representation of the categories of variables

c) Fishermen' opinions regarding the most significant negative development in fisheries in the past ten years

In Table 4, the compliance values are presented for the NLCCA sets used in the analysis to determine the most significant negative development in fisheries in the past ten years according to the age, education and income status of the fishermen. As seen in Figure 6, income source and education were the most important indicators determining their opinions on this point, and there is a very strong negative correlation between the variables for education and income source.

Table 4. Compliance values for analysis

		Dimension		Sum
		1	2	
Loss	Set 1	0.247	0.331	0.578
	Set 2	0.249	0.335	0.584
	Mean	0.248	0.333	0.581
Eigenvalue		0.752	0.667	
Fit				1.419

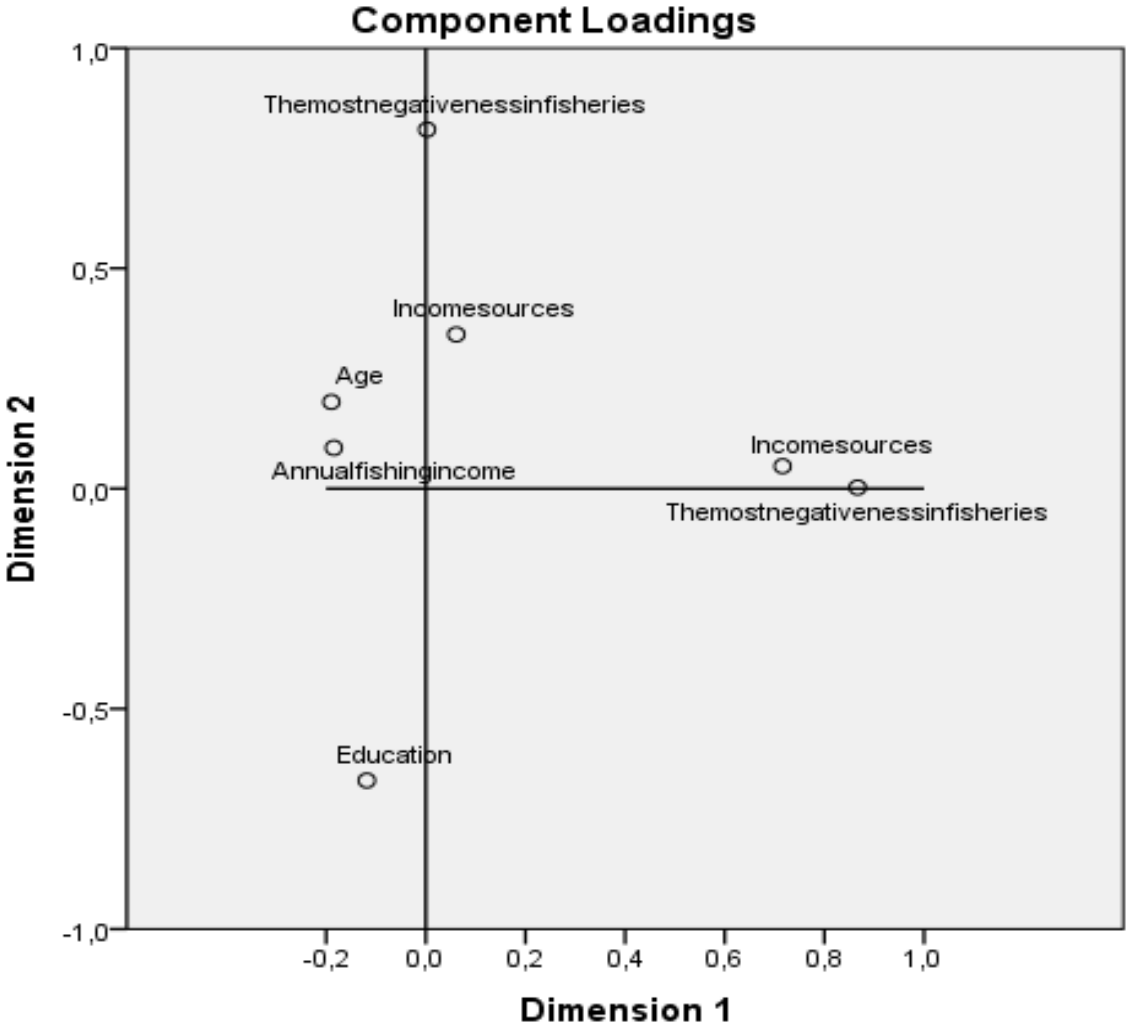

Figure 6. Graphical representation of component loads of the variables

In examining the graph of variable categories, it is clear that these categories form two homogeneous groups. According to the fishermen in the first group, who were middle school, high school, trade school or university graduates and who earned their living through fisheries+ farming, the most important negative development of fisheries in the past ten years was the decrease in the size and number of fish. On the other hand, the fishermen in the second group, who were between 30-45 years of age, whose yearly fisheries income was less than 25,000 TRY and who supported themselves through fisheries+farming+other income sources, thought that the most important negative development of the last ten years in the fisheries was environmental problems. It can be said that fishermen with high income levels, those over 65 years old, and those who made their living only by fisheries had no opinion regarding negative developments in their sector. It was determined that problems in pricing and marketing and insufficient regulation or lack of compliance were not seen as the most significant negative developments of fisheries in the last ten years (Figure 7).

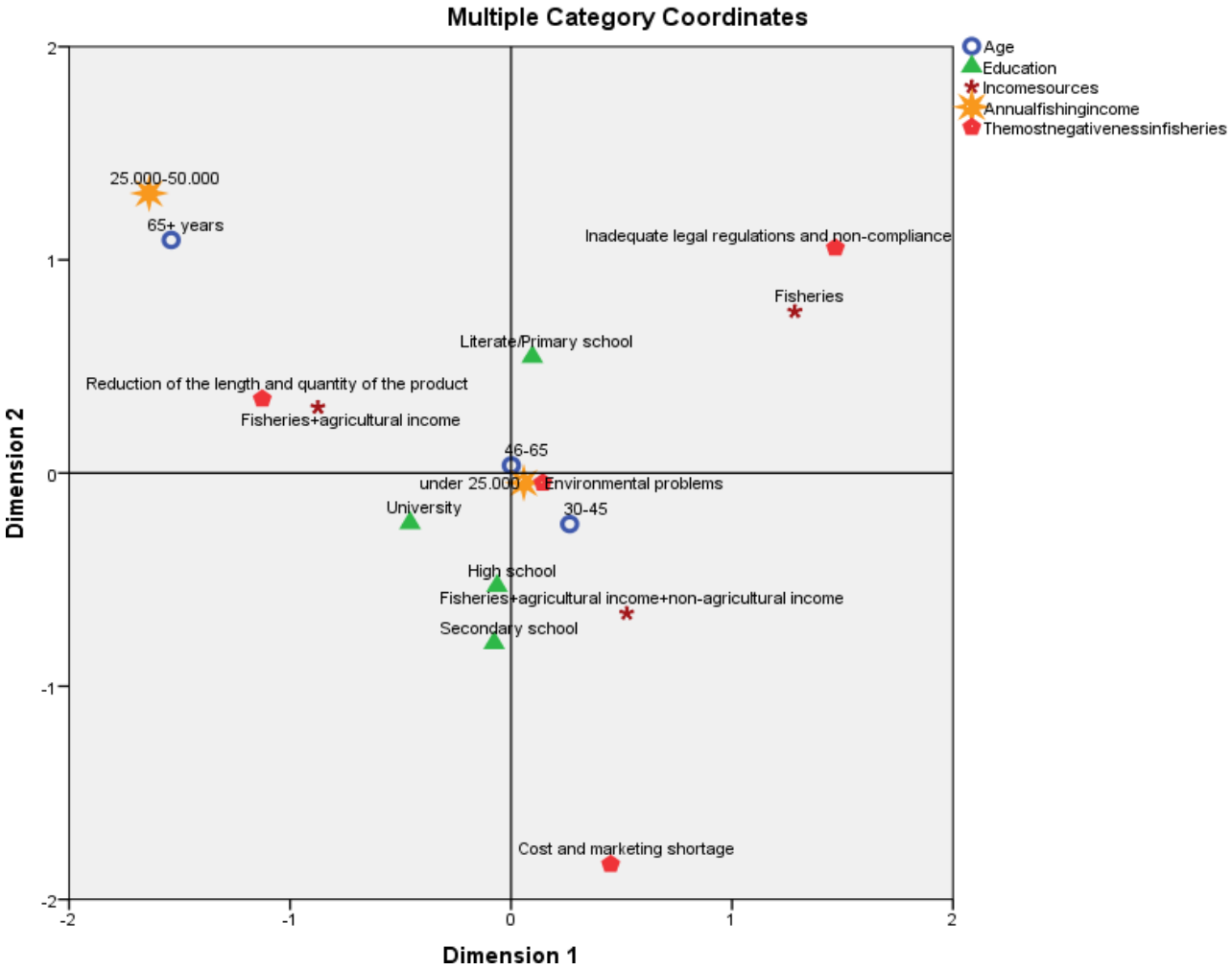

Figure 7. Graphical representation of the categories of variables

In the study finding regarding fishermen' opinions on the most important development, according to those who earned a living from fisheries and farming, were between 46-65 years old and who had an educational level of elementary/high school, the improvement of legal regulations was the most important development in fisheries. In a study by Korkut et al. (2015), fishermen who were active in Beyşehir Lake stated that it would benefit them if regulations were passed to provide them with social security and if agricultural support were given to them for a reasonable time period in order to attain a state of economic security. Likewise, a study on the socio-economic status of fishermen fisheries in Keban Reservoir in Pertek Region (Dartay et al., 2009) stated that certain legal measures and loans with reasonable repayment times and interest rates would benefit them in terms of social security. Accordingly, improvements in regulation seem to be a topic mentioned by fishermen in different fisheries grounds.

Fishermen of various education levels and income sources held a common view on the most significant development in fisheries in the past ten years: one group indicated that this was the increase in fish size and catch size. However, fishermen with a high education level thought that there had not been any significant developments of fisheries in the past ten years. Furthermore, it was seen that, for fishermen who supported themselves through fisheries+farming+other income sources and whose fisheries income level was low, the most important negative development in the past ten years was environmental problems (water pollution, decreasing water levels, weed growth in lakes/dam lake, etc.). Similarly, in the results of a study detailing the profile of women fishermen in Uluabat (Apolyont) Lake, it was stressed that in order to protect Uluabat Lake, first of all measures needed to be taken to educate the fishermen and to prevent pollution (Özer et al., 2011).

It has been reported that there is eutrophication in Egirdir Lake and Demirköprü Dam Lake (Kesici and Kesici, 2006; Erdoğuş, 2016), and the pollution in Egirdir Lake and Marmara Lake basins triggers eutrophication in these lakes (Aslantürk and Çetinkaya 2017; Gülersoy, 2013). Therefore, it is inevitable that environmental problems are mentioned in our study as negative developments by fishermen in each fishing ground.

CONCLUSION

According to the findings of the research, fishermen have different opinions/thoughts on three important issues that are considered in the scope of the research. While fishermen do not have a common view on overfishing whether there is overfishing or not, none of the fishermen recommended quota sharing or closing the lake/dam lake to fisheries in the case of overfishing.

Fishermen over 65 years of age have been uninterested in whether there is a overfishing in their fishing grounds. On the other hand, it is gratifying that the fishermen who are older are aware of the legal regulations made in recent years and consider this is a positive development.

In line with the views of fishermen, it would be appropriate to focus on the following topics by the relevant institutions and organizations:

- Completing the carrying capacity estimates in the inland water resources and ensuring that the fishing is carried out in a sustainable manner without damaging the stocks,
- Solution-oriented projects should be created by decision-making and implementation institutions and organizations responsible for especially inland fisheries management in order to handle environmental problems,
- Fishermen with different views on overfishing should be informed about the consequences of overfishing in fishing grounds,
- Controls on the appropriate length and amount of the product should be increased in fishing areas, if needed,
- Projects aimed at integrating fishermen with higher age and income levels to fishing should be implemented,
- Measures to minimize the negative effects of overfishing in fishing areas should be determined,
- Raising the awareness of fishermen in fishing grounds about catchable minimum length of fish (carp, European Catfish, pikeperch, silver fish) and crayfish.

REFERENCES

Anonymous, 2016. The Communiqué on Regulation of Commercial Fishery No. 4/1.

Aslantürk, A., Çetinkaya, O., 2017. Pupa Çayı Havzası'nın (Isparta) Besin Elementleri Yükünün Belirlenmesi. Süleyman Demirel Üniversitesi Eğirdir Su Ürünleri Fakültesi Dergisi, 13(1), 22-31. DOI: 10.22392/egirdir.312227.

Çiçek A., Erkan, O.,1996. Tarım Ekonomisinde Araştırma ve Örnekleme Yöntemleri, Gaziosmanpaşa Üniversitesi Ziraat Fakültesi Yayınları No:12, Ders Notları Serisi 6., Tokat.

Dartay, M., Duman, E., Duman, M., Ateşşahin, T., 2009. Keban Baraj Gölü Pertek Bölgesi Balıkçılarının Sosyo-Ekonomik Analizi. E.Ü. Su Ürünleri Dergisi, 26 (2), 135-138.

Erdoğuş, M., 2016. Demirköprü Baraj Gölünün Bazı Fizikokimyasal Parametrelerinin İncelenmesi. Yüksek Lisans Tezi. İzmir Kâtip Çelebi Üniversitesi, Fen Bilimleri Enstitüsü, Su Ürünleri Anabilim Dalı, 66, İzmir.

Franquesa, R., Idrissi, M. M., Alarcón, J. A., 2001. Feasibility Assessment for a Database on Socio-Economic Indicators for Mediterranean Fisheries, FAO-GFCM, Studies Reviews No:71, Roma, 55 s.

Gülersoy, A. E., 2013. Marmara Gölü Yakın Çevresindeki Arazi Kullanım Faaliyetlerinin Zamansal Değişimi (1975-2011) ve Göl Ekosistemine Etkileri. Türk Coğrafya Dergisi, 61, 31-44.

Kesici, E., Kesici, C., 2006. Eğirdir Gölü (Isparta)'nün Doğal Yapısına Yapılan Müdahalelerin Gölün Ekolojik Yapısına Etkileri. E.U. Journal of Fisheries & Aquatic Sciences, 23(1/1), 99-103.

Korkut, S.O., Saygı, H., Cesur, M., 2015. Socio-Economic Structure of the Fishermen on Lake Beysehir. Türk Tarım ve Doğa Bilimleri Dergisi, 2(2), 157–162.

Köksal, Ö., Cevher, C., 2015. Buğday Tarımında Sertifikalı Tohum Tercihini Etkileyen Faktörler Üzerine Bir Araştırma, Tarım Ekonomisi Araştırmaları Dergisi, 1 (1): 29-39.

Özer, A., Soylu, M., Uzmanoğlu, S., 2011. Uluabat (Apolyont) Gölü Kadın Balıkçılarının Profili. İstanbul Üniversitesi Su Ürünleri Dergisi, 25 (2), 11-24.

Özer, O.O., Özden, A., 2013. Ege Bölgesi Yaş Meyve ve Sebze İhracatçılarının Bireysel Farklılıklarının İncelenmesi. Tarım Ekonomisi Dergisi, 19(1), 71-79.

Sabatella, E., Franquesa, R, 2004. Manual of Fisheries Sampling Surveys: Methodologies for Estimations of Socio-Economic Indicators in the Mediterranean Sea FAO-GFCM, Studies Reviews No:73, 37, Roma.

TÜİK, 2018. Fisheries Statistic 2018, Turkish Statistics Institute, Ankara.

Yavuz, G. G., Ataseven, Y. Z., Gül, U., Gülaç, Z. N., 2015. Su Ürünleri Tüketiminde Tüketici Tercihlerini Etkileyen Faktörler: Ankara İli Örneği. SUMAE Yunus Araştırma Bülteni, 2015 (1), 73-82. DOI:10.17693/yunus.68105.