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Determination of Organic Fish Purchase Tendency of Consumers: A Case Study for Hatay Province, Turkey

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Abstract: Numerous studies have developed and validated models and instruments for consumer behaviours. However, cahracteristics of decision making still remain unknown. In this study, we attempted to investigate decision making behaviours of consumers for organic fishery products in Hatay province of Turkey. The data were collected from Antakya district located in the centre of Hatay province and were analyzed with factor analysis method. Out of 442 reports gathered through face to face interviews, 412 were found to be suitable for the analysis. Results indicated that four factors were found to be effective in assessing consumer tendencies regarding organic fish consumption. Shopping place, quality, health and price were the main factors, which explained 65.34% of the variation. More than half of the consumers seemed to be willing to pay 10-30% more for organic fish. In addition, organic fish consumtion tendency is accounted for 36.20% in the research area. It appears that there is a potential market for organic fishery products in the area under the investigation.

Key words: Organic fish consumption, willingness to pay, factor analysis, desicion making

INTRODUCTION

Aquaculture (the farming of aquatic animals and plants), much like organic agriculture is one of the world's fastest growing food sectors. Globally, aquaculture production has been growing at an average rate of 9% per year since 1970, compared with 2.9% for terrestrially farmed meat production and 1.3% for capture fisheries. However to date, aquaculture has lagged behind the agriculture sector in terms of the quantities and diversity of certified organic produce (Scialabba and Hatam, 2002). Organic agriculture is practiced in almost all countries of the world and its share of agricultural land and farms is growing.

The total organically managed area is >24 million ha world-wide a ccording to various certification bodies. The market for organic products is growing in many other countries and was valued about 23 billion $ (2002). Official interest in organic agriculture is emerging in many countries shown by the fact that those countries have fully implemented regulation on organic farming or are in the process of drafting regulation (Willer and Yussefi, 2006).

Today, organic aquaculture production takes place primarily in Europe, where certified organic Salmon, carp and trout are grown and sold. Certified organic mussels, tiger shrimp, white shrimp and tilapia also are cultured in such diverse places as Vietnam, Peru, Ecuador, Chile, New Zealand and Israel. Standards and certification procedures are set by just a few certification agencies.

Consumer and market studies confirm a growing demand for both organic food products and for fish and related food products coming from conventional aquaculture. Despite the unresolved status of the certification and labeling of organic aquatic animals and plants in Turkey, the parallel successes of both organic livestock and conventional aquaculture markets have encouraged producers to be involved in both sectors to explore a niche for organic aquacultural products. There are documented trends in the growth of other organic

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livestock sectors and in the sales of natural, hormone-free and antibiotic-free fish and shellfish. This increasing demand has started to drive producer and retail interest in aquacultural products that have a certified organic label.

Food and Agriculture Organization (FAO) report from 2002 approximated the current international production for organic aquaculture and estimated that total production in 2000 was only about 5,000 metric tons, primarily from European countries. In addition, it was estimated that production will increase 240-fold from 5,000 tons in 2000 to 1.2 (million) tons by 2030. Such a production of certified aquatic products would be equivalent to 0.6% of the total estimated aquaculture production in 2030.

Recently, with an environmental cares and healthy food consumption, importance of organic food products is increasing in Turkey as in the developed countries. Organic production in Turkey began in 1990s and reached up to 15,000 tons in 57,000 ha area in 2005. It takes thirtieth places in the world (Yussefi, 2003). Management of finfish populations and oyster culture also started in Turkey's confined environments as in other Mediterranean countries due to the particular ecological conditions. Turkish aquaculture has reached significant levels, comparable to other agricultural productions, which were considered as a marginal activity 15 years ago and most Mediterranean countries are involved in such growth. This origin strongly conditioned the beginning of the modern marine Mediterranean aquaculture (Basurco, 2001). At present, there is no supply of fresh organic fish in Turkey, whether it is under independent certification schemes, national or EU legislation.

However, in recent years demand for organic food has exponentially grown. In Turkish vision 2023 project, prepared by together with 85th year development planning and the scientific and technological research council of Turkey, encouragement and supporting of organic agricultural production was objected (Anonymous, 2000, 2003). The main interest here is to examine consumer reactions and tendencies to the organic fish consumption. For this aim, the factors effective on the consumer decision making to the purchasing organic fish were analyzed in Hatay province center. There are not many studies regarding consumer preferences on organic fish consumption as it was a new and developing activity. Therefore, results of this study will be useful to improve the sector according to consumer tendencies.

MATERIALS AND METHODS

Data sources of investigation include: total population of the center of Hatay province obtained from compilation of statistics from State Institute of Statistic (SIS); data of consumer socio economic charactaristics and organic fish consumption choices and tendencies obtained directly from the consumers by face to face questionaries in the year 2009. In addition, other relevant secondary sources such as, research articles and state reports etc. were used.

Research method: In this study, factor analysis method was used commonly used in the understanding the consumer beheviours in the world (Sprotles and Kendall, 1986). It is an explanation of changes in the dependent variables with a smaller number of independent factors (Digestion *et al*., 2008).

There are a number of different general factor models. The most common two models are common factor analysis and component factor analysis. It is depend on the aim of the research. The mathematical model of the factor analysis for standard i variable is Eq. 1:

$$X_i = A_{i1}F_1 + A_{i2}F_2 + ...+ A_{ik}F_k + U \quad (1)$$

where:

F = General factors
U = Unique factor
A = A constant to combine number of k factors

The assumption is there was no corolations between unique factors and geneleal factors. Factors are derived from observed variables and can be predicted as their linear components. A general equation of F_j, which is Jth factor is Eq. 2:

$$F_j = \sum W_{ji}X_i = W_{j1}X_1 + W_{j2}X_2 + ... + W_{jp}X_p \quad (2)$$

where:

W_i = Scor numbers
p = Variable numbers

There are a number of iterations were tried and finally, there are 4 factors, wish have high community factors derived within 10 variables of the of consumer decision-making characteristics. Significant correlations between 4 factors of the consumer decision-making characteristics are found. This study adopted the factor analysis method using SPSS (Statistical Package for the Social Sciences) software, version 16.0. In the analysis, PC (Principal Component analysis) method and varimax extraction method were used (Joseph *et al*., 1992).

Factor analysis was applied to determine the view point of consumers. The consumption of the organic fishery products was investigated in the case of Hatay province. Firstly, we judged whether selected variables were suitable for carrying out factor analysis according to Bartlett test of sphericity and Kaiser-Meyer-Olkin (Leech *et al*., 2005). Secondly, the factors were extracted according to the scree spot and the initial solution of factor analysis and then the correlation of extracted factors was tested by the variance matrix of variables; the

design object of factor analysis was verified. In addition, to determine the correlation between variables communality factor was used (Leech *et al*., 2005). Lastly, according to the component matrix and factors explaining the population variance of the original variables, salesroom factor, product quality factor, healthy factor and price factor impacting on consumer's tendensies were summed.

RESULTS AND DISCUSSION

Socio-economic characteristics of fish consumers in Antakya district were shown in Table 1 in which consumers were classified under 3 monthly income groups: low (<1000 TL), medium (1001-2000 TL) and high (>2001 TL) income groups. Low and medium income level consumers represented the major portion (84.1%) of the population under the study. However, high income group had about 3 times more per capita income than the low one and the more the income level was the higher the food and fish consumption (Table 1). In addition per capita fish consumption in general was high (2.0-3.0 kg/person/month) probably because red meat prices are high and the area has long coast on Mediterranean sea. This shows that consumers sensitivity to the prices is high.

Table 2 represents the consumers Willingness to Pay (WTP) an extra price for organic fish. The results of this study showed that consumers were willing to pay about 51.6% more price for organic fish. It was about 64% in another research in 2005 in Turkey (Budak *et al*., 2005) and 43.6% in Italy (Defrancesco, 2003). Fourteen percent were willing to pay up to 50% or more for an organic product. Twenty-one percent said they would be willing to pay >50% per pound of organic fish in the US (O'Dierno *et al*., 2006). Thus, the findings either in Turkey or in the world showed that there was a significant tendency and potential market for organically farmed fishery products.

Factor analysis is generally adopted where there is a certain linear relation among the original variables. This study examined the suitability of factor analysis through KMO (Kaiser-Meyer-Olkin) test and Bartlett's test of sphericity. The results showed the measured value of Bartlett's test of sphericity is 751.967, the probability values were smaller than the significance level a (a = 0.05). Therefore, the null hypothesis was refused and the correlation was considerably significant. In addition, the KMO value of the research was 0.767, according to Kaiser test standard. Thereby, the original variables were suitable for carrying out a factor analysis. The community factor was found as 0.653 and it was also acceptable for the analysis (Tobias and Carlson, 1969) (Table 3).

Table 4 shows the variances and factor loadings in Eigen values. Initially, number of factors was equal to number of variables; however, the number of factors to be examined was decreased according to factor loadings and percentage of variances. A total of 10 variables were investigated under four factors explaining the 65.34% of the variation. This ratio was found to be quite high (Dagistan *et al*., 2008).

When deciding the number of factors, we used screen plot with which the first break-point was determined by the first factor and so on (Fig. 1). Variances and Eigen values of the four factors shown in Fig. 1 were depicted in Table 5. The highest loading on the first factor was shopping explaining 21.74% of the variation (Table 5). The second factor was named as product quality which explained 18.36% of the variation (Table 5). Third and fourth factors were health and price explaining 13.84 and 11.40%, respectively (Table 5). Results of the factor analysis showed that the four factors cumulatively explained 65.34% of the total variation (Table 5). The dependency ratio four each variable and factor combination was also calculated by multiplying the square of the factor loading values by 100 (Table 6). The dependency ratio was considered significant if the value was larger than 3.2% (Kim and Mueller, 1997).

Shopping place factor: Table 7 shows the factor loadings, which were determined at 5% significant level with 200 observation and only those values larger than 0.180 were taken into consideration (Joseph *et al*., 1992). Correlation values showed that the highest loadings on the first factor were on food presentation and vendor (Table 7). Consumer tendency about organic fish consumption seemed quite dependent on food presentation and

Table 1: Some socio-economic features of consumers

Income groups	Monthly income (%)	Household size (person)	Child (number)	Food expenditure		Fish consumption and expenditure		
				Total	Per capita	Total (TL month^{-1})	Per capita (TL month^{-1})	Per capita fish consumption (kg month^{-1})
Low	42.2	3.8	2.0	254.0	66.8	28.6	7.5	2.0
Medium	41.9	4.2	2.1	449.0	106.5	55.6	13.2	2.0
High	15.9	3.9	1.7	686.7	178.4	83.6	21.7	3.0
Average	100.0	4.1	2.1	408.0	99.0	49.6	12.0	2.0

Table 2: Willingness to an extra Price (WTP) for organic fishery products (%)

VTP (%)	Consumer frequency	Percentage
05-00	139	39.2
06-10	83	23.4
11-20	71	20.0
21-30	29	8.2
31-40	8	2.3
41-50	9	2.5
50- +	16	4.5
Total	355	100.0

Table 3: Variables used in the study community factors

Variables	Community factor
Price	0.871
Freshens	0.719
Appearance	0.661
Nutritions	0.720
Quality	0.585
Packing	0.646
Organic	0.636
Variety	0.403
Product presentation	0.666
Vendor	0.627
General average	0.653

Table 4: Eigenvalues and variances of factors in the initial solution

Factors	Eigen values	Variances (%)	Cumulative variances (%)
F1	3.177	31.774	31.77
F2	1.274	12.743	44.52
F3	1.057	10.565	55.08
F4	1.025	10.254	65.34
F5	0.777	7.770	73.11
F6	0.705	7.054	80.16
F7	0.635	6.353	86.51
F8	0.534	5.336	91.85
F9	0.439	4.395	96.24
F10	0.375	3.755	100.00

Table 5: Eigenvalues and variances of factors in the result matrix

Factors	Eigen values	Variances (%)	Cumulative variances (%)
Shopping place	2.174	21.737	21.737
Product quality	1.836	18.360	40.097
Healthy	1.384	13.837	53.934
Price	1.140	11.403	65.337

vendor. The percentage of total variance explained by these variables was 21.74% (Table 5). The average factor loadings of these two criteria were calculated as 0.77, thus, this factor was named as shopping place factor. Except price, freshness and nutritional value, all other variables were also significantly and positively correlated with the first factor although, values were relatively low (Table 6).

Product quality factor: The second factor has the highest loadings on freshness and appearance and to some extent quality, therefore, it was called as product quality factor (Table 7). These three criteria were usually dependent on each other since, the total variance explained by those

Table 6: Dependency ratio between variations and the criterias (%)

Variables	F1	F2	F3	F4	Total dependency ratio
Price	0.185	0.036	0.000	86.862	87.083
Freshens	0.325	71.403	0.130	0.096	71.954
Appearance	6.052	59.136	0.903	0.040	66.131
Nutritions	2.016	6.864	63.044	0.032	71.956
Quality	7.290	27.878	13.250	10.112	58.530
Packing	6.101	0.168	34.340	0.058	40.667
Organic	16.000	0.160	25.806	0.740	42.706
Variety	18.063	5.954	0.185	16.000	40.202
Product presentation	61.466	4.884	0.137	0.000	66.487
Vendor	55.950	6.300	0.423	0.006	62.679

Table 7: The result matrix of factor loadings

Variables	F1	F2	F3	F4
Price	0.043	0.019	0.000	0.932
Freshnes	0.057	0.845	0.036	-0.031
Appairance	0.246	0.769	0.095	0.020
Nutritiones	-0.142	0.262	0.794	0.018
Quality	0.270	0.528	0.364	-0.318
Packing	0.247	-0.041	0.586	-0.024
Organic	0.400	-0.040	0.508	-0.086
Variety	0.425	0.244	0.043	-0.400
Product presentation	0.784	0.221	0.037	-0.001
Vendor	0.748	0.251	-0.065	-0.008

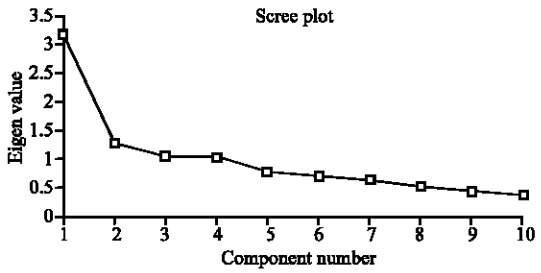

Fig. 1: Graphs used in determining the number of factors

was 18.36% (Table 5) and average factor loadings on these criteria were calculated as 0.71 (Table 7). Price, packing and organic was not significantly correlated with the second factor ($p>0.05$) and although, significantly correlated with the second factor, the remaining variables had lower loading values.

Health factor: Third factor had the highest loadings on nutritional value and to some extent packing and organic (Table 7). These variables are closely related with consumer health and explained 13.84% of the total variance (Table 5) and average factor loading of 0.63; therefore, it was the named as health factor. Although, quality factor was significantly positively correlated with the second factor, its value was lower than other nutritional value, packing and organic variables (Table 7). The results may suggest that consumers, who pay attention to good health, tend to prefer organic fish.

Price factor: The highest loading on the fourth factor was on price, hence, named as price factor (Table 7). The total variance explained by only the price criteria was 11.40% (Table 5).

Quality and type of fish was significantly and negatively correlated with price factor (Table 7) implying that consumers seemed to be sensitive to price of fish. Other variables were not significantly correlated with the forth factor (Table 7).

Tendency to buy organic fish appeared to be low if the prices were higher. It was especially, expected that medium income consumers are more sensitive to prices. Additionally, less expensive fish types were determined to be preferred more.

CONCLUSION

Organic fishery production is limited, but growth is strong. One of the main problem is getting into mainstream distribution channels. Scale is necessary in sales and marketing. Critical mass to get retail and consumer attention organic fishery production is a future important sub-sector in aquaculture. But, we must develop both supply and demand side to be able reach potential because, it creates important economic and social benefits for producers and for consumers.

The organic fish consumption tendencies are accounted for 36.20% in the research area. The 51.60% of the consumers are willing to 10-30% extra money for organic fish consumption. In other words, there is a potential market for organically farmed fishery products in Turkey. This is an important factor for encouraging the sector. The results also presented the main effective factors on consumer decision making on organic fish consumption such as price, shopping place, health and quality.

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