Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 16, Issue 2, 2016
PRINT ISSN 2284-7995, E-ISSN 2285-3952

ASSESSMENT OF AWARENESS LEVELS ON GOAT MILK AND PRODUCTS: THE CASE OF ÇANAKKALE

Ferhan SAVRAN[1], Özdal KÖKSAL[2], Duygu AKTÜRK[1], Sema GÜN[2], Gülçin KAYA[1]

[1]Canakkale Onsekiz Mart University, Faculty of Agriculture, Department of Agricultural Economics, Canakkale 17020, Turkey, Email: ferhansavran@hotmail.com
[2]Ankara University, Faculty of Agriculture, Department of Agricultural Economics, Ankara 06130, Turkey.

Corresponding author: ferhansavran@hotmail.com

Abstract

Cheese production from goat milk has a core place in Çanakkale's economy. The present study was conducted to determine the consumption trends in goat milk and products and to determine the factors effective in preference of these products. Data were gathered from the household through questionnaires.

Key words*: goat milk, goat cheese, goat milk and cheese demand*

INTRODUCTION

Goats are quiet adapted to agricultural and economic structures especially of poor and developing countries. The main reason of this adaptation is because goats are highly resistant to harsh car-feeding conditions compared to other farm animals and they can well-benefit from the natural resources. Goats can meet their feed from the nature by themselves even under the most unfavorable conditions and they can withstand thirst and hunger for longer periods than the other animals. Goat raising has an ever-increasing significance in various parts of the world because not only of their easy care and feeding, but also of high nutritional values of goat milk [10].

According to United Nations Food and Agriculture Organization (FAO), there are 996,120,851 goats in the world and number of milking goat is 197.463.071 heads. The annual goat milk production worldwide is 17,846,118 tons. Considering the developments in world goat inventory, China is the leading country and it is followed respectively by India and Pakistan. Goat raising is commonly practiced especially in less developed or developing countries. Turkey has the 27th place in world goat inventory. In goat milk production, India, Bangladesh and the Sudan are the leading countries and Turkey has 17th place in world goat milk production [4].

World goat milk consumption can be assessed under three groups. The first one is the domestic (inner family) use of goat milk and products in less developed or developing countries. The second one is processing and consumption of goat milk as industrial drinking milk, yoghurt and etc. in developed countries like Spain and France. The third one is consumption by the people with digestive system disorders and allergy to cow milk [18]. Despite significant consumption and thus production levels throughout the world, especially in EU countries, production of goat milk and products is still at insufficient levels. The share of goat milk in total milk production of Turkey is only 2%. There are scientific researches carried out to determine goat milk consumption trends in various countries of the world such as the United States of America, Sweden and Japan. However, such studies about consumption trends of these products are quite limited in Turkey [14].

Generally extensive sheep and goat raising is practiced in Turkey. Resultant livestock products are mostly constitute the basic food stuff of low-income agricultural enterprises. Such activities provide contributions to family

income and some employment opportunities[6].

Because of natural and agricultural structure, extensive goat raising practices are common in Çanakkale province of Turkey. However, number of enterprises with intensive goat raising activities is increasing recently [11].

Considering the goat inventory and goat milk production of Çanakkale province, it was observed that goat milk production of the province increased from 26,354 tons in 2008 to 29,349 tons in 2013. The province constitutes about 7.05% of total goat milk production of Turkey.

The present study was conducted to determine the consumption trends in goat milk and products and to determine the factors effective in preference of these products. Therefore, the study was performed in Çanakkale province with intensive goat raising activities.

MATERIALS AND METHODS

Goat milk and product preferences of the households living in central town of Çanakkale province and the factors affecting their preferences were investigated in this study. Data were gathered from the household through questionnaires. Household approach was used in previous studies to determine dairy product consumption trends in Turkey [9, 15, 3, 5, 17, 2, 7]

According to TUIK (Turkish Statistics Institute) 2013 data, total population of Çanakkale central town is 149,881 people. Of this population, 116, 078 are living in town center, 33,803 are living in districts and villages. Total number of household in central town is 41,456 and average household size is 2.8 people. Instead of including entire households, a sampling was performed to decide about the household coverage of the study. For this purpose, rational sampling method was used [13, 12] and 99% probability and 10% error margin was used and finally sample volume was calculated as 166.

Regression analyses were used to put forth the socio-economic effecting goat milk and product consumption of households. Initially, various functions such as linear, logarithmic, square, exponential and etc. were tried to decide about model structure and linear model was considered to have the best fit. In this model, the consumption status of goat milk and products (non-consuming and consuming ones) were considered as dependent variable and gender, age, number of people in household, existence of under 14 child in household, education level, monthly average income, monthly average food expense, monthly average dairy expenses were considered as independent variables for consumer groups. The existence of multiple collinearity among the independent variables throughout estimation process of the model was tested with variance inflation factor (VIF) and condition index (K) values.

In logistic model, independent variable mean is calculated as a probability as follows:

Let the probability of desired incident as P, and probability of undesired incident as 1-P.

β_0 : Equation constant (intercept)

β_1, β_2.....and β_p : Regression coefficients for independent variables (Slopes)

X_i : the value for i^{th} independent variable (for instance: discrete variate, for i=1, X_1=1 or X_1=0) and

p : Number of variables (i= 1,2,3,……p)

Probability of desired incident (Y=1);

$$P(Y=1|X_1, X_2.....X_p) = \frac{e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}}{1+e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}} \text{ or}$$

$$P(Y=1|X_1, X_2.....X_p) = \frac{1}{1+e^{-(\beta_0+\beta_1X_1+.....+\beta_pX_p)}};$$

Probability of undesired incidence (Y=0)

$$P(Y=0|X_1, X_2.....X_p) = 1-P(Y=1|X_1, X_2.....X_p)$$
$$= 1-\frac{e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}}{1+e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}} = \frac{1}{1+e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}}$$

The ratio of these two probabilities to each other is called as "odds ratio.

Odds ($Y=1|X_1,X_2……X_p$) ratio 0:

$$\frac{P}{1-P} = e^{\beta_0+\beta_1X_1+.....+\beta_pX_p}$$

Or $\frac{P}{1-P} = e^{\beta_0}e^{\beta_1X_1}.....e^{\beta_pX_p}$.

When the natural logarithm (Ln) of both sides of the equation was taken, the logistic regression equation, in which the relationship between dependent and independent variable

turns into a linear form, can be written as follows:

Logit (P) = $\log\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \ldots\ldots\ldots + \beta_p X_p$ [1; 8].

RESULTS AND DISCUSSIONS

Of the survey participants, 47.6% were male and 52.4% were female consumers. Considering the possible effects of educational levels on consumptive trends and decision making, educational levels of consumers were also assessed. The university or vocational collage graduate consumers constituted the greatest portion (59%) of the participant consumers and they were followed by secondary or primary school graduates (22.9%) and high school graduates (18.1%). Average consumer age was identified as 37.13 years, monthly average income as 3,019 TL, monthly average food expenses as 578.3 TL, monthly average dairy expenses as 115.9 TL and average household size as 3.04 people (Table 1). Monthly average household milk (cow, sheep and goat) consumption was 13.6 lt/month and monthly average cheese (cow, sheep and goat) consumption was 3.92 kg/month.

Of the participant consumers, 19.9 were consuming goat milk, 36.1% were consuming goat cheese and 3% were consuming goat yoghurt.

The households buying one of these 3 products were considered as consuming goat milk and products and they were taken as dependent variable.

The household consuming (43.4%) and non-consuming (56.6%) goat milk and products were assessed in comparison with the independent variables provided in Table 1.

Likelihood ratio test was used to measure the significance of an independent variable in logistic regression model. Following the assessment of general statistics of the model, (model degree of freedom was 2, $\chi 2$ value was 20.009 ($p<0.001$) and class verification ratio was 61.4%), parameter estimations (β), standard error, Wald statistics-dependent significance level, degrees of freedom and likelihood ratios are provided in Table 2.

Model fit was tested through backward elimination method with iterations and the best model was obtained in 7 iterations (Table 2).

According to best model, it was observed that except for household size and monthly average food expenses, remaining characteristics did not have any significant effects on goat milk and product consumption of household ($p>0.10$). A 1 TL increase in household food expenses decreased goat milk and product consumption probability by 1.57% (1/0.634). Similarly, a person increase in household size decreased goat milk and product consumption probability by 1% (1/0.999).

Table 1. Socio-economic factors effecting consumption of goat milk and products

Variables	Groups	Categories	Number	%
Gender	Gender (1)	Consumer gender		
	Gender (2)	Female	87	52.4
		Male*	79	47.6
Age	Continuous data	-	-	-
Education	Education (1)	Consumer education		
	Education (2)	Primary and secondary school	38	22.9
	Education (3)	High school	30	18.1
		Vocational Collage/University *	98	59
Monthly income	Continuous data	-	-	-
Monthly food expense	Continuous data	-	-	-
Montly dairy expense	Continuous data	-	-	-
Household size	Continuous data	-	-	-
Number of children under 14 years		<14 years old		
		Exist	112	66.5
		No-exist*	54	32.5

**Assessed as reference category in logistic regression analysis.*

Table 2. Results of logistic regression analysis for the effects of consumer socio-economic characteristics on goat milk and product consumption

STEP	Independent Variables	B	SE	Wald	df**	Sig.	Exp (B)
Step 1	Age	-0.013	0.019	0.504	1	0.478	0.987
	Gender (1)	-0.162	0.186	0.763	1	0.382	0.850
	Gender (2)	0.000*			0		
	Education (1)	-0.189	0.338	0.312	1	0.576	0.828
	Education (2)	-0.075	0.313	0.057	1	0.811	0.928
	Education (3)	0.000*			0		
	Household monthly income	0.001	0.001	0.385	1	0.529	1.000
	Household food expense	-0.001	0.001	2.126	1	0.145	0.999
	Household dariy expense	-0.003	0.002	1.148	1	0.284	0.997
	Household size	-0.352	0.171	4.242	1	0.039	0.703
	Under 14 years in household (1)	0.098	0.194	0.257	1	0.612	1.103
	Under 14 years in household (2)	0.000*			0		
	Constant	2.888	1.020	8.020	1	0.005	17.951
Step 2	Age	-0.022	0.016	1.882	1	0.170	0.978
	Gender (1)	-0.170	0.177	0.916	1	0.339	0.844
	Gender (2)	0.000*			0		
	Household monthly income	0.001	0.001	0.248	1	0.618	1.000
	Household food expense	-0.001	0.001	1.686	1	0.194	0.999
	Household dairy expense	-0.003	0.002	1.496	1	0.221	0.997
	Household size	-0.386	0.167	5.358	1	0.021	0.680
	Under 14 years in household (1)	0.109	0.193	0.318	1	0.573	1.115
	Under 14 years in household (2)	0.000*			0		
	Constant	3.272	0.913	12.848	1	0.001	26.358
Step 3	Age	-0.020	0.016	1.696	1	0.193	0.980
	Gender (1)	-0.178	0.176	1.019	1	0.313	0.837
	Gender (2)	0.000*			0		
	Household food expense	-0.001	0.001	2.891	1	0.089	0.999
	Household dairy expense	-0.003	0.002	1.527	1	0.217	0.997
	Household size	-0.394	0.166	5.619	1	0.018	0.675
	Under 14 years in household (1)	0.101	0.192	0.278	1	0.598	1.106
	Under 14 years in household (2)	0.000*			0		
	Constant	3.109	0.846	13.502	1	0.001	22.392
Step 4	Age	-0.020	0.016	1.641	1	0.200	0.980
	Gender (1)	-0.175	0.176	0.989	1	0.320	0.839
	Gender (2)	0.000*			0		
	Household food expense	-0.001	0.001	2.950	1	0.086	0.999
	Household dairy expense	-0.003	0.002	1.417	1	0.234	0.997
	Household size	-0.423	0.157	7.295	1	0.007	0.655
	Constant	3.209	0.824	15.173	1	0.001	24.672
Step 5	Age	-0.019	0.016	1.523	1	0.217	0.981
	Household food expense	-0.418	0.001	2.639	1	0.104	0.999
	Household dairy expense	-0.001	0.002	1.395	1	0.238	0.997
	Household size	-0.418	0.156	7.174	1	0.007	0.658
	Constant	3.108	0.811	14.667	1	0.001	22.367
Step 6	Age	-0.017	0.015	1.181	1	0.277	0.983
	Household food expense	-0.001	0.01	5.643	1	0.018	0.999
	Household size	-0.429	0.156	7.556	1	0.006	0.651
	Constant	2.919	0.787	13.744	1	0.001	18.529
Step 7	Household food expense	-0.001	0.001	5.391	1	0.020+	0.634
	Household size	-0.455	0.153	8.820	1	0.003+	0.999
	Constant	2.339	0.559	17.485	1	0.001++	10.369

*This parameter is set to zero because it is redundant (The standard error cannot be calculated for this, of course, since the parameter is set to zero).
**Degrees of Freedom, +p<0.01, ++p<0.001 SE: Standard Error

CONCLUSIONS

Current findings arouse a suspicion that goat milk and products had the characteristics of Veblen goods. In economics, Veblen goods are types of material commodities for which the demand is proportional to its high price, making the goods desirable as symbols of the buyer's high social status. According to current data, although it is not possible to assess goat milk and products as a status scale, it can be asserted based on insignificant effects of consumer income, educational level and age that consumption of these types of products could not be correlated with socio-economic characteristics and their consumptions realized independent of consumer incomes and product prices.

It was seen in this study that consumers did not much prefer goat milk and products.

Being unaccustomed to, unpleasant smell and lack of knowledge were considered as the reasons for such low consumption levels. Demo groups should be created and advertisements should be made to introduce goat milk and products, to overcome such negative issues and ultimately to increase consumption levels.

High prices and less appearance in markets were also considered as the reasons for such low consumption levels. Current dairy operations should tend to goat milk and market such products through easily-accessible marketing channels and price ranges should be brought to reasonable levels.

In goat milk processing, cheese, especially Ezine cheese has a special priority. Beside this, production of drinking milk should also be increased since goat milk is healthier than the other milks. Relevant informative and awareness works should be carried out about the benefits of goat milk and products.

REFERENCES

[1]Agresti, A., 2002, Categorical Data Analysis, 2nd Edition, John Wiley and Sons, 743 pp., 2002 Hobeken, NJ.

[2]Akbay, C., Tiryaki Yildiz, G, 2007, Tüketicilerin Ambalajlı ve Açık Süt Tüketim Alışkanlıklarının Karşılaştırmalı Olarak İncelenmesi: Kahramanmaraş Örneği, KSÜ Fen ve Mühendislik Dergisi, 10(1):89-96.

[3]Andiç, S., Şahin, K., Koç, S., 2002, Van Merkez Ilçe Kentsel Alanda Süt Tüketimi. Yüzüncü Yıl Üniv. Ziraat Fakültesi Tarım Bilimleri Dergisi. 12 (2):33-38.

[4] Anonymus a, 2014, FAO, http://www.fao.org/, http://faostat.fao.org/site/569/ Erişim Tarihi: 25.04.2014

[5]Çelik , Y., Karli, B., Bilgiç, A., Çelik, Ş., 2005, Şanlıurfa İli Kentsel Alanda Tüketicilerin Süt Tüketim Düzeyleri ve Süt Tüketim Alışkanlıkları, Tarım Ekonomisi Dergisi, 11(1) :5- 12.

[6]Dellal, İ., Keskin, G., Dellal, G., 2002, GAP Bölgesinde Küçükbaş Hayvan Yetiştiren İşletmelerin Ekonomik Analizi Ve Hayvansal Ürünlerin Pazara Arzı, TEAE, Proje Raporu 2002-2, Temmuz 2002, Ankara.

[7]Erdal, G., Tokgöz, K., 2011, Tüketicilerin Ambalajlı ve Açık Süt Tüketim Tercihlerini Etkileyen Faktörler: Erzincan İli Örneği, KMÜ Sosyal ve Ekonomik Araştırmalar Dergisi, 13(20):111-115.

[8]Eyduran, E., 2006, Profil analizi, Doktora semineri, Yüzüncü Yıl Üniversitesi Fen Bilimleri Enstitüsü, s.27., 2006, Van.

[9]Hanta, B., Yurdakul, O., 1995, Adana İli Kentsel Alanda Hayvansal Gıda Tüketim Yapısı, Çukurova Üniversitesi Ziraat Fakültesi Dergisi, 10(2):169-184.

[10]Koyuncu, M., 2005, Keçi Yetiştiriciliğinin Dünya ve Türkiye Stratejileri. Süt Keçiciliği Ulusal Kongresi, Bildiriler: 59-65. 26-27 Mayıs 2005, İzmir.

[11]Kumuk, T., Savran, F., Aktürk, D., Tan, S., Kayalak, S., Everest, B., Niyaz, Ö.C., 2011, Keçi Yetiştiriciliğinin Çanakkale İli Ekonomisindeki Yeri ve Önemi, Çanakkale Onsekiz Mart Üniversitesi Ziraat Fakültesi Çanakkale Tarımı Sempozyumu Bildiriler Kitabı, (54-60) Nisan 2011.

[12] Miran, B., 2002, Temel İstatistik, Ege Üniversitesi Basımevi, Bornova-İzmir.

[13]Newbold, P., 1995, Statistics for Business and Economics, Prentice-Hall, New Jersey.

[14]Savran, F., Aktürk, D., Dellal, İ., Tatlidil, F., Dellal, G., Pehlivan, E., 2011, Türkiye'de Seçilmiş Bazı İllerde Keçi Sütü ve Ürünleri Tüketimine Etkili Faktörler, Kafkas Üniversitesi Veterinerlik Fakültesi Dergisi, 17 (2): 251-256. arası Bitkisel Üretim ve Hayvancılık Dergisi, Ocak-Şubat 2013, 100-109.

[15] Şahin, K., Gül, A., 1997, Adana İli Kentsel Alanda Ailelerin Süt Ve Süt Mamulleri Alım Ve Tüketim Davranışları, Çukurova Üniversitesi Ziraat Fakültesi Dergisi, 12(4):59-68.

[16]Şahin, K., Andiç, S., Koç, Ş., 2001, Van İli Kentsel Alanda Ailelerin Otlu Peynir ve Süt Ürünleri Alım ve Tüketim Davranışları, Yüzüncü Yıl Üniversitesi Ziraat Fakültesi Tarım Bilimleri Dergisi, 11(2):67-73.

[17]Şimşek, O., Çetin, C., Bilgin, B., 2005, İstanbul İlinde İçme Sütü Tüketim Alışkanlıkları ve Bu Alışkanlıkları Etkileyen Faktörlerin Belirlenmesi Üzerine Bir Araştırma. Trakya Üniversitesi Ziraat Fakültesi Dergisi, 2 (1):23-35.

[18]Yarali, E., Atay, O., Gökdal, Ö., Çetiner, Ş., 2013, Keçi Sütünün İnsan Beslenmesi Açısından Önemi ve Türkiye'de ve Dünyada Keçi Sütü Üretimi, Adnan Menderes Üniversitesi, Çine Meslek Yüksekokulu.