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EVALUATION OF MULTI-DIMENSIONAL EFFECTS ON THE ECOLOGY OF GOAT FARMING IN TURKEY: THE CASE OF ADANA PROVINCE

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Abstract

Goats are inseparable part of Mediterranean ecosystem determined by flora, land conditions and climatic conditions. The effects of goat grazing on ecology have not been studied for a long time. But the existing of positive or negative effects of goat grazing on ecology has been debated. The determination of effects of goat farming on ecology from aspects of different institutions is the aim of this study. Also the strengths and weaknesses of goat farming, the threats and opportunities were revealed via SWOT Analysis method. For obtaining data, survey method was used. Among the people interviewed 71.11% expressed opinion that goats are not a threat for ecology, and 28.89% had view that goats are a threat. When looking from institutions' aspect, 92.31% of people from Environment Engineering, 73.53% of people from Environment and Forests Directorate of the City, 65.52% of people from Agricultural Faculty and 57.14% of people from Municipality expressed that goats are not a threat for ecology. Considering this result, almost half of municipality employees expressed that goat farming is a threat for ecology. Almost all of the people we interviewed from Department of Environment Engineering expressed that the goat is not a threat for ecology. The most important result which we can deduce about goat farming from the study is that the goat farmers must be trained how to choose consciously where to let the goats graze in order to minimize the negative effects on ecology.

Key words: goat farming, ecology, SWOT analysis

Introduction

The regions where the goat farming is common are such places where nature and living conditions are hard and vegetable farming opportunities are limited. According the data of TSI (Turkish Statistics Institute), the goats constitute 18.92% of total number of 29 568 152 small ruminants in Turkey in 2008. Almost all of the goats in our country consist of hair goat (97.17%). With its 5.6 million goats, Turkey has a share of 1% of the world stock. As a result of serious decreases in total number of small ruminants, the number of goats decreased approximately 65% in last 25-30 years (TSI, 2009). On the other side during the last 25-30 years, the share of goats in milk production decreased from 5% to 1.7% and their share in meat production decreased from 7.7% to 2.5% (FAO, 2009). The gradual decrease in material obtained from goats during these years is really thought-provoking. It can be seen that rather than searching for promoting methods in order to increase production of cheap meat and milk in such high population, such studies have been rapidly decreasing (Koyuncu et al., 2005).

Sheep and goat farming in Turkey is performed in extensive manner generally; obtained animal products constitute the main nutrition sources of low-income farms, contributing income and creating employment opportunities (Dellal et al., 2002).

Because of flora, land conditions and climatic conditions, goat is the inseparable part of the Mediterranean ecosystem. Especially stony, prone and bumpy ground doesn't allow to raise any other animal expect goat. Goats are very dynamic animals. They can easily move on very vertical shoulders and rocky places. They are better on climbing than other farm animals. Also they are the animals which take advantages of youngest branches of woody plants such as bush and trees, and thorns. Because of their physical abilities and grazing talents, they are the best on taking advantages of damaged pasture lands (Babalık and Fakir, 2007). Despite of all those positive effects of goats on ecology, the usage of our pasture areas more than 2-3 times of their capacities naturally decreases the efficiencies of our pasture areas. Because of this, people are not content with grazing in those pasture areas and they start to graze in ranges and marquise groves in forests. Also goat owners cut tree branches in order to feed their goats in winters.

Kurtze (1982) analysed the goats' farms in Africa and compared to other production activities and demonstrated their superiority. Panayiotou (1989) determined the economic structure of the sheep and goat farms in Cyprus. Papanagiotou (1991) calculated profitability of goat farming in Greece. Gebremedhin and Gebrelul (1992), examined the small-scale goat farms by the selected three production systems and compared net present value, financial feasibility and payback period scores. Brandano et al (1992) studied the quality and quantity of goat farms production activities in Italy. Deoghare and Bhattachryya (1993) analysed goat farming in some selected areas of India. Darwich (1998) examined the socio-economic structure of small animal production in the Jabel Abdel Aziz of Syria. Dellal (2000) examined economic structures and annual performance of hair goat farms in Antalya province and obtained optimum farm plans under existing production possibilities. She found that the percentage of GPV from hair goat breading was 65.20% in total GPV. Also she found that large farms were more successful than others. Araç (2007) determined the structural characteristics of goat farms in Diyarbakır province. He found that average grazing period in the farms were 107 day/year. He calculated lactation period of the goats and average milk yield were as 4.53 months and 0.8 kg/day, respectively. The author expressed that goat breeding in Diyarbakır region was difficult in farm conditions. Paksoy (2007) analysed economic structure of goat farming in Kahramanmaraş province. He found that large farms were more successful than small ones. Ruiz et al (2009) analysed and proposed improvements for the dairy goat grazing systems in three countries (Spain, France and Italy). They identified the main weaknesses related to feeding management, particularly grazing, and to the goat productivity. They proposed on the nutritional utilization of rangelands and pastures and correct feed supplementation. Özdemir (2009) investigated structural and breeding characteristics and health protection applications of the Angora goat farms. She found that the average Angora goat number in farms was 165.2 head, Angora goat breeding experience of farms were 32.5 years. Author also examined the production systems, the pasture, shelter characteristics, the water resources and labour force. Acar (2010) determined technical and structural characteristic of the Member Enterprises of Isparta Breeding Sheep Goat Association. He found that there were a lot of technical and structural problems of farms such as breeding, nutrition, health management, housing and grazing. Çıtak (2011) calculated that goat breeding gross production value (GPV) was 85.94% of livestock GPV. Goat GPV with 69.22% took the biggest portion of total farm GPV. She determined that large scale goat farms were more successful than small farms.

Goat farming is very important for rural development and economic activity diversity in Taurus Mountains including Adana province. The effects of goat grazing on ecology have been known for a long time. But the existing of positive or negative effects of goat grazing on ecology is debated. That's why; the determination of effects of goat farming on ecology from aspects of different institutions in Adana city is the aim of this study.

Material and Methods

The main material of this study involves people from different disciplines related to effects of goat farming on ecology. These are academic members of Agriculture Engineering and Environment Engineering departments of Çukurova University, employees of Forest Management and Municipality. For acquiring data, survey method was used. Survey study was conducted in year 2010 and 90 peopled informed about the topic from the institutions were involved by using "Target-based Sampling Method". Because of the belief that they are qualified, the Zoo-technology and landscape architecture departments from Agriculture Faculty of Çukurova University were involved into survey study. Also for municipalities, the engineers working in General Directorate of Parks and Gardens were involved into the survey study. After reviewing the data acquired via surveys, data were analysed by using suitable statistical packet program.

Strengths, weaknesses, opportunities and threats of goat farming were revealed via SWOT analysis method. The data about Strengths, weaknesses, opportunities and threats of goat farming were constructed from survey studies conducted in institutions and studies made earlier on the same topic. The number of studies about goat farming is gradually increasing countrywide.

SWOT analysis is an analysis which makes inner and outer environment evaluation possible. SWOT is an abridgment consisting of first letters of those words:

S: Strength (it means the determination of superior specifications of organization)

W: Weakness (it means the determination of weak specifications of organization)

O: Opportunity (it means the determination of opportunities which organization has)

T: Threat (it means the determination of threats and dangers which organization faces) (Aktan 1999).

The aim of SWOT analysis is to create strategies which maximizes the profit from strengths and opportunities and minimizes the effects of weaknesses and threats by considering inner and outer factors. SWOT analysis doesn't focus on the fields of opportunities and strengths but it also focuses on weaknesses and possible near threats.

Result and Discussion

Total 90 people who were interviewed for the survey were from City Environment and Forest Directorate (37.37%), from Agriculture Faculty of Çukurova University (32.22%), from Municipality (15.66%) and from Environment Engineering Department of Çukurova University (14.44%) (Table 1).

The mean age of participating people was 36.51 and 95% of the participants are university or higher graduated. 67.78% of participants were male and 32.22% were female. Considering the positions of participants in their institutions, they are mostly engineers and academic members (Table 2).

The reasons for the similarity of human milk and goat milk were asked to participants and 55.56% pointed the vitamin and mineral content similarity, 35.56% expressed that it is because goats naturally and periodically graze with plants hard-to-reach and 8.89% declared that they have no idea.

Table 1
The distribution of survey participants according to institutions

Institutions	N	%
City Environment and Forest Directorate	34	37.78
Agriculture Faculty of Çukurova University	29	32.22
Municipality	14	15.56
Environment Engineering Department of Çukurova University	13	14.44
Total	90	100.00

The question "Do you think that goat is a threat for ecology (environment)?" was asked to participants and 71.11% expressed that goats are not threats for environment and 28.89% said that goats are threat for environment. Considering the institutions; 92.31% of people from Environment Engineering, 73.53% of people from City Environment and Forest Directorate, 65.52% of people from Agriculture Faculty and 57.14% of people from municipality expressed that goats are not threats against ecology. This result showed that, almost half of municipality employees expressed that goat farming is a threat for ecology. But almost all interviewed from Environment Engineering expressed that goats are not threats to ecology (Table 3).

According to the participants expressing that goats are threat against ecology, they stated that uncontrolled goat farming damages some of tree species, causes ecological annihilation and erosion. On the contrary, according to the participants expressing that goats are not threat against ecology, they stated that goats are a ring of the natural balance chain and they have many positive contributions such as plant propagation and fire protection unless uncontrolled grazing is performed.

The evaluation of effects of goats on ecology according to the institutions was explained in Figure 1. Institutions were asked to grade judgment sentences thought to explain goats' effects on ecology clearly. So, the most efficient explaining sentences are as follows; "With training of grazers and goat

Table 2
Descriptive statistics about participant

Sample Size	90
Age (average)	36.51
<=30 (%)	21.11
31-40 (%)	45.56
>=41 (%)	33.33
Education Level, %	
High school	3.33
University	47.78
Post-Graduate/Doctorate	47.78
Gender, %	
Female	32.22
Male	67.78
Position, %	
Academic Member	35.56
Engineer	48.89
Officer	10.00
Employee	5.56

Table 3
The goats' threat position according to representatives of institutions

Institution	Is goat a threat against ecology?					
	Yes		No		Total	
	N	%	N	%	N	%
Agriculture Faculty	10	34.48	19	65.52	29	100.00
City Environment and Forest Directorate	9	26.47	25	73.53	34	100.00
Municipality	6	42.86	8	57.14	14	100.00
Environment Engineering Dept.	1	7.69	12	92.31	13	100.00
Total	26	28.89	64	71.11	90	100.00

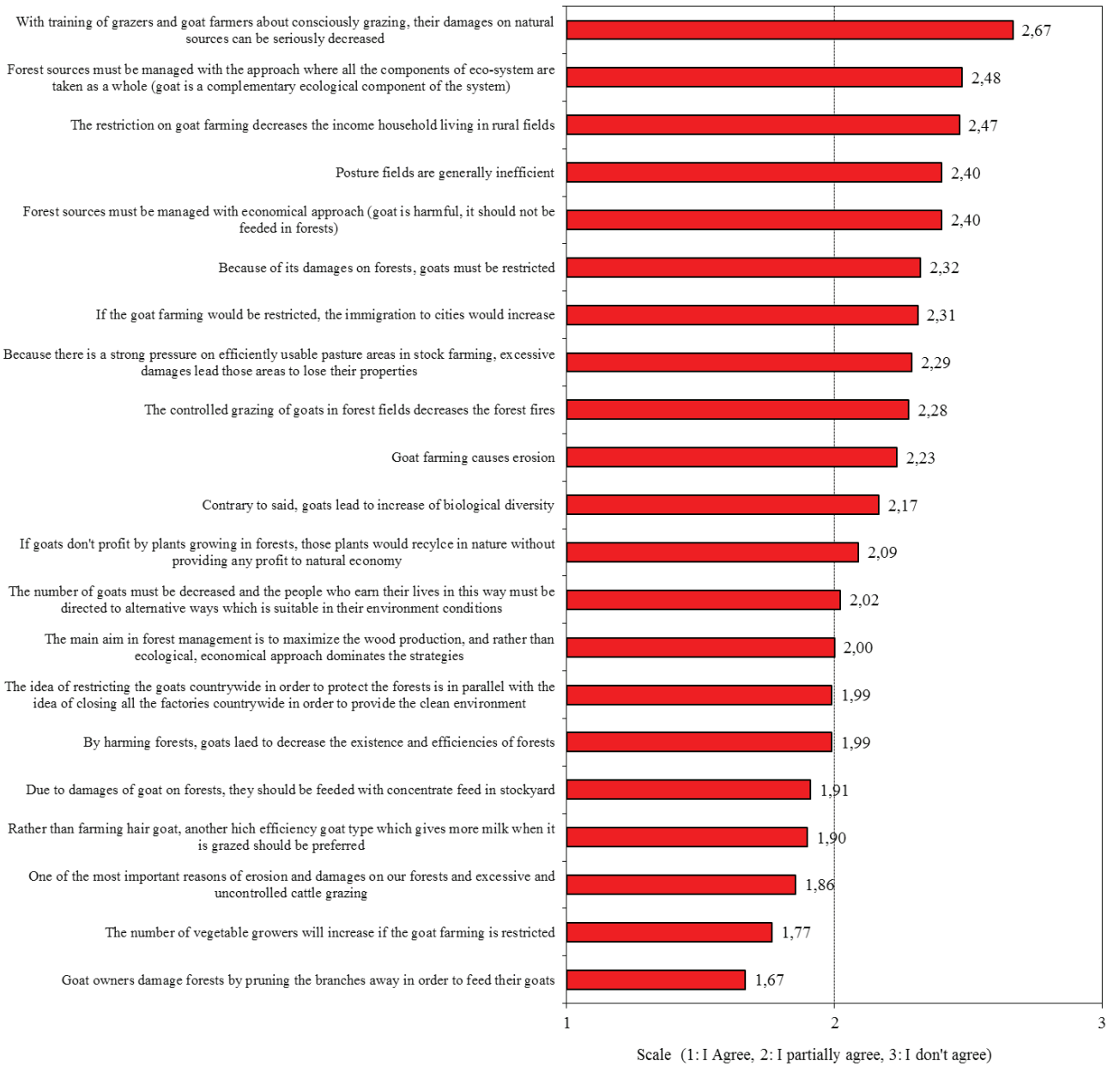

Fig. 1. The evaluation of effects of goats on ecology according to the institutions (average points)

farmers about consciously grazing, their damages on natural sources can be seriously decreased", "Forest sources must be managed with the approach where all the components of ecosystem are taken as a whole (goat is a complementary ecological component of the system)", "The restriction on goat farming decreases the income of households living in rural fields".

The least efficient explaining sentences are as follows; "Goat owners damage forests by pruning the branches away in order to feed their goats", "The number of vegetable growers will increase if the goat farming is restricted", "One of the most important reasons of erosion and damages on our forests and excessive and uncontrolled cattle grazing". The most important points we could understand from those sentences are that the negative effects of goats on ecology can be eliminated by farmers' training about grazing, and that the goats are a part of ecosystem, and that the restriction on goat farming decreases the income of households living in rural field and natural lands.

Strengths, weaknesses, opportunities and threats of goat farming were revealed via SWOT Analysis. The data acquired via SWOT Analysis were constituted by combin-

Table 4
SWOT results for goat farming

STRENGTHS (S)	WEAKNESSES (W)
1. Improves biological diversity 2. Is hundreds-years-old tradition and a culture 3. Is a chain in natural balance 4. Goat products are very important for community health 5. The products obtained from goats contribute on national economy 6. Goat products are organically popular 7. Goat is not only an economic issue, but it is also a social issue 8. Goat milk is the nearest milk to human milk in terms of vitamin and mineral content 9. Is the main nutrition and income source for people living especially near forests and mountain villages 10. They can take advantages of damaged pasture areas because of their superior physical and grazing talents 11. They eat many silages which other animals don't eat, and transform them into animal products 12. There is a new structuring hope in goat farming because of relations with EU	1. Goat milk and products have specific strong smell, 2. Some people are sensitive for goat products 3. The number of goats have been decreased in last 20 years 4. Besides technical unorganized site, goat farmers are also an economically unorganized group 5. Because goat farmers are generally small scaled companies, they constitute the poorest part of society and stock farmers 6. Pasture areas are generally inefficient
OPPORTUNITIES (O)	**THREATS (T)**
1. Geographic location and geopolitical importance of Adana province 2. The increase expectation for demand of goat milk and products 3. The pushing power of EU membership process 4. They decrease the risk of forest fires by controlled grazing implementations 5. Goat farming is very important for rural development and economic activity diversity 6. We know that goat milk and products are very beneficial for health 7. There is an expectation about selling the goat milk and products in future with high prices 8. There is a potential for organic stock farming 9. There is a cooperation for solving the problem with socio-economical and scientific approaches	1. By damaging forests, goats decrease existence and efficiency of forests 2. Goat owners damage forests by pruning the branches away in order to feed their goats 3. One of the most important reasons of erosion and damages on our forests is excessive and uncontrolled cattle grazing 4. If the goat farming would be restricted, the immigration to cities would increase 5. The restriction on goat farming decreases the income of households living in rural fields 6. Goat farming causes erosion 7. There is an organization problem 8. The education levels of goat farming and especially grazing are not adequate 9. The restriction on goat farming causes ecological and social problems 10. The restriction of goat farming causes socio-cultural deformation

ing survey studies made with institutions and earlier studies about same issue, and many important points were revealed (Table 4). Revealing these data about goat farming is very important for creating strategies, taking measurements and implementing them.

Conclusions

Goat is a typical part of the Mediterranean ecosystem due to its vegetation, terrain and climate conditions. In particular, the stony, curved and hilly terrain does not allow other grazing animals than goats. Some impact on the ecology of goat grazing has been known for a long time. However, the positive or negative impact on the ecology of goat grazing is debatable. 71.11% of the persons interviewed stated that there is no threat to the ecology of goats. In terms of institutions, about half of the municipal employees stated that breeding goats pose a threat to the ecology. In the department of environmental engineering almost all of the people interviewed stated that goats pose a threat to ecology. In the study, the reduction of adverse effects on goat's ecology, to educate conscious grazing of the goat breeders, should be considered as importnat part of the ecosystem preservation, and natural life if the ban leads to the conclusion lead to a reduction in the income of people living in both rural areas.

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