

Cost-Benefit Analysis of Angora Goat Production in Turkey: The Cases of Konya and Karaman Provinces

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Makale Kodu (Article Code): KVFD-2009-643

Summary

The profitability of Angora goat breeding enterprises was analyzed in this study. According to the findings of the research study, the number of the Angora goats, which was 1.3 million in 1990, fell to 158.168 in 2008. According to the managers of the farms carrying out Angora goat production, the most effective factor in the decrease of the number of Angora goats was the decrease in mohair prices. It was found that in farms performing goat production, the average size of herds was 43.4 heads and the average available land was 19.69 ha. In Angora goat production, the ratio of gross profit to production value was 48.73%, while the ratio of net profit to production value was 13.49%. The Angora goat production value consisted of 54.56% inventory value increases, 39.10% milk production value and 6.34% mohair value. While mohair was the main source of income in the years between 1960 and 1970; currently it has become a source of supplementary income as mohair prices have not increased at a desired rate.

Keywords: Angora goat, Cost-benefit analysis, Turkey

Türkiye’de Tiftik Keçisi Yetiştiriciliğinin Fayda-Masraf Analizi: Konya ve Karaman İlleri Örneği

Özet

Bu çalışmada tiftik keçisi yetiştiren işletmelerin karlılığı analiz edilmiştir. Araştırma bulgularına göre Türkiye’de 1990 yılında 1.3 milyon olan tiftik keçisi sayısı 2008 yılında 158.168 adete düşmüştür. Tiftik keçisi yetiştiren işletme yöneticilerine göre tiftik keçisinin azalmasında en etkili faktörün tiftik fiyatlarındaki düşme olduğu ifade edilmiştir. Tiftik keçisi yetiştiren işletmelerde ortalama sürü büyüklüğü 43.4 baş, ortalama arazi varlığının ise 19.69 ha olduğu belirlenmiştir. Tiftik keçisi üretiminde brüt karın, üretim değerine oranı %48.73, net karın üretim değerine oranı ise %13.49 olarak tespit edilmiştir. Tiftik keçisi üretim değerinin %54.56’sını envanter değer artışı, %39.10’unu süt üretim değeri ve %6.34’ünü ise tiftik değeri oluşturmaktadır. 1960-70’li yıllarda tiftik ana gelir dalı iken, mevcut durumda tiftik fiyatlarının istenen düzeyde artmaması nedeni ile yan gelir dalı konumuna gelmiştir.

Anahtar sözcükler: Tiftik keçisi, Fayda-masraf analizi, Türkiye

INTRODUCTION

Sheep and goat breeding activities are among the significant alternative sources of income with regard to improvement of the economic status and the living conditions of the people working and dwelling in rural areas and increasing employment opportunities in such areas. Goat production is largely dependent on land and requires intensive labor. For this reason, goats are

generally produced in developing countries where labor is abundant and unemployment is a common problem and in this way, it becomes possible for the people to produce and consume animal products at a low cost ¹⁻³. Management, maintenance and milking are quite easy processes in goat breeding. The maintenance and feeding of goats do not generally require expertise.

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Although the intensity level of goat production shows variation (predominantly milk, meat, hair or mohair), goat breeding is a highly extensive production area which requires extensive labor⁴⁻⁷.

There are a total of 830.4 million heads of goats in the world, approximately 1% of which is bred in developed countries and 99% in developing countries in 2007. 4.828.237 tons of goat meat is produced in the world and goat meat consumption is generally higher in developing countries⁸. The number of goats in Turkey is 5.593.561 heads and 97.17% of this number consists of hair goats and 2.83% consists of Angora goats in 2008. In recent years, although the numbers of both hair and Angora goats have significantly decreased, the decrease in the number of Angora goats has been much bigger. For example, the number of Angora goats fell from 1.184.942 heads in 1991 to 158.168 heads in 2008⁹.

Angora goat farming in Turkey was able to preserve its status as one of the main sources of income for the agricultural enterprises in the mountainous areas of the Middle Anatolia, especially the provinces of Ankara, Karaman and Konya until the last 30 years. More than one product can be obtained in Angora goat farming in agricultural enterprises. The most valuable product of the Angora goat is mohair, followed by the inventory value increase (live weight and growth maintained through the new-born and aged), leather and manure. Mohair is among the demanded textile raw materials due to its silver-white color, brightness, length, elasticity, strength, being easily mixed with other textile fibers and its good quality for dyeing. Mohair fabric (soft fabric) was named the Angora mohair fabric in domestic and foreign markets and over many years, mohair production, processing and trade affected the economy of the agricultural enterprises in the provinces where mohair was produced. Production of mohair as a textile raw material is highly important for meeting the increasing demand of consumers for organic textile products and for the tourism activities in rural areas especially in the 21st century³.

There is relatively few number of scientific studies that were carried out to analyze the economic aspect of Angora goat farming in Turkey. The studies were generally conducted in the province of Ankara¹⁰⁻¹³, conducted on breeding and species of goats^{13,14}. Scientific studies on the analysis of the contribution of goat farming activities to income and employment in the provinces of Konya and Karaman have not yet been conducted. In the present study, first the developments regarding the existence of goats and Angora goats were evaluated at a macro level and then the economic aspect of goat farming was investigated in the agricultural enterprises located in

Konya and Karaman, the two provinces of the Middle Anatolia Region where a significant number of Angora goats exist. The structural characteristics of the Angora goat farming enterprises, animal inventory, herd components and period of keeping in the enterprise, gross production values of goat breeding activities, production costs, gross and net profit levels, producer tendencies, the reasons for the decrease in the number of Angora goats and the expectations of the producers concerning the future were discussed in the study.

MATERIAL and METHODS

In the study, firstly the macroeconomic aspect of mohair production was examined by using the records of institutions such as the FAO and the State Institute of Statistics. The economic analysis of the production activities was performed by using the data collected through questionnaires from the farms in the Konya and Karaman provinces of the Middle Anatolia region, where Angora goat farming is at a substantial level. The villages have been selected by an aim sampling method of Konya and Karaman provinces and 46 Angora goat production enterprises which is located in these villages have been selected by whole counting method. The data were collected through questionnaires that were administered in 46 enterprises. By using the questionnaire, physical and financial data regarding the 2005-2006 production period was collected from individual producers.

In research area, high mountains that surround the plateaus of the Middle Anatolia Region prevent the effects of the characteristics of the sea climate from reaching inner regions. Accordingly, arid climate characteristics are generally observed in the region. For this reason, continental climate is effective in Konya, Karaman and other provinces of the region. The average annual precipitation is between 390-520 mm in the region¹⁵. Cereals, legumes and forage crops are cultivated in the dry farming areas of the region. In addition to these products, industrial plants, fruit and vegetable cultivation is carried out in the irrigated areas. Although plant production is dominant in the plains, animal production is given importance in high mountainous areas.

The economic analysis of the Angora goat was performed by using partial budget analysis¹⁶. For the production activity branch analysis, the net profit of the production branch was calculated by subtracting the production cost from the gross production value of the examined production activity, and the gross profit of the production branch was calculated by subtracting the variable costs of the production activity from the gross production value^{17,18}.

The production costs were determined based on the amounts of input that was actually used by the producers in Angora goat farming and the prices they paid for these amounts of input. The variable and fixed costs in Angora goat farming were analyzed. The economic life of the fixed capital elements and the economic life of mature female and male goats were taken as basis while calculating the amortization, and the average real interest rate (5%) was used to determine the interest of the capital invested in fixed capital elements. The working capital interest was calculated via the stockbreeding credit interest rate (average 18%) by taking into account the amount of time (an average of 6 months) during which the capital was tied. The relative sale value method was used in cost analysis and through this method, the total production costs were distributed among goat products according to their shares in gross production values ^{16,19}. In this way, the total production costs per product were calculated and the unit product costs were calculated by dividing the total costs by the amount of production ²⁰.

RESULTS

The Changes in the Number of Goats in Agricultural Enterprises in Turkey

In Turkey, goat production is generally carried out in and around forest areas and in regions where land is steep and not suitable for the production of plants and other animals. In this context, goat breeding is carried out in the forms of family enterprises, goat farming in agricultural enterprises, village herds, transhumance and migratory herds. However, in recent years, intensive milk goat enterprises which provide raw material for cheese production units (such as dairies) have been established in Western Anatolia ²¹.

The dry climate of the Central Anatolia Region with low precipitation is highly suitable for Angora goat breeding. In the research area, Angora goats are grazed in plateaus and pastures for 7-9 months, and this period is 8 months on average. During the period of grazing in

pastures, supplementary feeding is practiced only in the months of April and May in the spring season and supplementary feed is not given to animals (except kid feed) in other months. This is a factor which decreases the Angora goat production costs of enterprises.

The Angora goat is an animal kept for revenue in agricultural enterprises in the region for a long time and goat breeding has been carried out as a traditional activity especially in villages located inside and around forests where the land is mountainous. However, the number of goats has shown a continuous tendency to decrease in Turkey. The decrease observed in the number of Angora goats after the 1970s accelerated particularly after the 1980s and the Angora goat population has decreased 27.8 times today when compared to 1970 in Turkey.

The state ban on goat production in forest villages in order to protect forests and the decrease in the young population in mountain villages as a result of the rapid migration from rural areas to cities especially after the 1980s are among the reasons for the decrease in the number of goats in agricultural enterprises. Another significant factor is the absence of adequate government support for developing Angora goat production in areas besides forest villages.

Land Assets and Land Use in Farms

The majority of the agricultural enterprises in Turkey (67.43%) carry out plant production together with animal production and 30.21% of the enterprises only perform plant production activities. For this reason, land is one of the primary factors affecting the activities and the profitability of agricultural enterprises. The average size of land used by the per enterprises in the research area is 19.69 ha, 79.08% of which is owned land and ownership-based management is dominant in the region (*Table 1*). Considering the land use by the enterprises, it can be seen that the agricultural enterprises are small scale family businesses. However, the average land per enterprise in the region is 3.2 times bigger compared to the average land per agricultural enterprise (6.1 ha) in Turkey.

Table 1. Land assets and land tenure forms of agricultural enterprises

Tablo 1. İncelenen işletmelerde arazi varlığı ve tasarruf durumu

Land Tenure Forms	Farms Land (ha)			
	Irrigated Land (ha)	Dry Land (ha)	Cultivated Land (ha)	Ratio (%)
Owned Land	4.86	10.71	15.57	79.08
Land under Rental or Crop-share	0.61	3.51	4.12	20.92
Total Cultivated Land	5.47	14.22	19.69	100.00
Ratio (%)	27.78	72.22	100.00	-

Sx of Cultivated Land: n=46, Mean: 19.69, Min: 0.1, Max: 62.50, Ss: 146.96

Of the land cultivated in the farms, 77.22% was dry arable land and was used for grain production. 27.78% of the land was composed of irrigated fields. Sugar beet, bean, corn, clover, tomato and fruit production was carried out on irrigated land. Although the average land per enterprise in the research area is 3.2 times bigger compared to the average land per agricultural enterprise in Turkey, the farmers stated that the land did not provide adequate income because it was mostly dry agricultural land.

Physical Characteristics of Angora Goats Produced in Farms

According to the statements of the enterprise managers, male breeding goats are kept in the herd for 4.13 years, mature females for 5.75 years, yearlings for 1.84 years and kids for 1.25 years. It was found that the average live weight of the mature males in the herds was 47.25 kg/head, yield 53.60% and carcass weight 25.44 kg/head; the average live weight of the mature females in the herds was 36.88 kg/head, yield 54.35% and carcass weight 20.04 kg/head; average live weight of the yearlings in the herds was 26.50 kg/head, yield 54.35% and carcass weight 14.40 kg/head and average live weight of the kids in the herds was 28.38 kg/head, yield 53.35% and carcass weight 15.14 kg/head (*Table 2*).

Table 2. Average live weight, period of keeping in the enterprise, yield and average carcass weight of Angora Goats

Tablo 2. Tiftik keçilerinde ortalama canlı ağırlık, işletmede tutulma süresi ve ortalama karkas ağırlığı

Animals	Average Live Weight (Kg)	Period of Keeping in the Enterprise (Years)	Yield (%)	Average Carcass Weight (Kg)
Male goat	47.25	4.13	53.60	25.33
Female goat	36.88	5.75	54.35	20.04
Yearling	26.50	1.84	54.35	14.40
Wether	28.38	1.25	53.35	15.14
Kid	13.85	0.73	52.45	7.26

It was found that the average period of pregnancy was 5 months, first mating age was 1.53 years and first calving age was 1.91 years in Angora goats in the enterprises. The producers met their demand for breeding animals from local animal markets, cooperatives, public corporations or from their neighbors, relatives and other producers. It was determined that the average birth rate at the enterprises which were included in the study was 96.73% (although there were twin births, there were also goats which became infertile), the average death rate was 7.85% in kids, 3.27% in yearlings and 1.06% in mature male and female goats.

Total Household Income in Farms and its Distribution According to Sources

Middle Anatolia is a region of Turkey where agricultural

land is abundant. For this reason, agricultural enterprises of the region generally carry out plant production together with animal husbandry. The share of plant and animal production values within the production values obtained vary among enterprises. The average gross production value in the enterprises examined in the study was found to be 10.717.71 TL, of which 62.81% constitutes the plant production value and 37.19% constitutes the animal production value. Wheat production activities had the highest share in the gross value of plant production (45.35%), followed by barley production with a rate of 21.86%. While sheep breeding had the biggest share in animal production value with a rate of 46.49%, cattle breeding had the second biggest share with 33.70% followed by Angora goat breeding with a rate of 18.86%. Angora goat production activities had a share of 7.01% in the total gross production value of the households.

Cost-Benefit Analysis of Angora Goats Production

Angora goat breeding is a process through which more than one product is obtained. These products are milk, mohair and inventory value increase. It was found that the average herd size was 43.4 heads in the Angora goat farming enterprises examined in the study. Selling price obtained by the producer for milk and mohair was

respectively 0.85 TL/Kg and 3.00 TL/Kg. The production value obtained with this herd size was 2.021.47 TL, of which 54.56% was inventory value increase (reproduction and growth), 39.10% was milk production value and 6.34% was mohair production value. While the main product in Angora goat production was mohair during the 1960s and 1970s, at present mohair has become a secondary source of income.

The production costs of Angora goat breeding were determined by using the partial budget method. The average production cost of the Angora goat production enterprises was found to be 1.748.75 TL, of which, 59.26% is composed of variable costs and 40.74% is composed of fixed costs. Feed costs (Hay, straw, mixed feed, broken barley and pulp) constitute the largest part of variable costs with 33.11%. This figure is followed by

shepherds' salaries with a rate of 32.98% (Table 3). The production value obtained in return for these costs was 2.021.47 TL. Gross profit was obtained by subtracting the variable costs from the production value and the net profit was obtained by subtracting the variable and fixed costs from the production value. Accordingly, gross profit was calculated as 985.08 TL and net profit was calculated as 272.72 TL. The share of gross profit within the total gross production value was 48.73% and the share of net profit was 13.49%.

DISCUSSION

Goat breeding is generally carried out by families with low income, and particularly by landless households or households that have a small land. The manufacturing of goat products can be carried out at a lower cost and with less labor compared to other animal production activities. For this reason, goat production is an important alternative source of income for small family enterprises in rural areas of developing countries.

Table 3. Costs and revenues in Angora Goat production (average per herd)

Tablo 3. Tiftik Keçisi üretiminde gelir ve giderler (sürü ortalaması)

Cost Elements	Amount (Kg)		Sum (TL)		Annual Total (TL)	Ratio (%)	Ratio (%)
	In the Sheepfold	In the Pasture	In the Sheepfold	In the Pasture			
Straw	2.604.72	328.25	130.23	16.41	146.64	8.39	14.15
Hay	31.25	-	3.13	-	3.13	0.18	0.30
Mixed feed	170.00	-	59.50	-	59.50	3.40	5.74
Broken barley	1.786.23	89.75	446.56	21.69	111.44	6.37	10.75
Pulp	130.00	-	22.45	-	22.45	1.28	2.17
Salt	11.83	16.25	6.35	8.78	15.13	0.87	1.46
Water			20.70	14.70	35.4	2.02	3.42
Pasture rent and grazing payment				1.25	1.25	0.07	0.12
Lighting costs					62.38	3.57	6.02
Veterinary fee					36.38	2.08	3.51
Vaccination and medication costs					56.55	3.23	5.46
Shepherd salary					341.78	19.54	32.98
Transportation costs					29.75	1.70	2.87
Shearing cost					15.28	0.87	1.47
Machinery repair and maintenance					7.63	0.44	0.74
Sheepfold disinfection costs					6.13	0.35	0.59
Working capital interest					85.57	4.89	8.26
Variable Costs					1.036.39	59.26	100.00
General management cost					31.09	1.78	
Household labor wage					285.38	16.32	
Sheepfold capital interest					69.95	4.00	
Sheepfold capital amortization					76.10	4.35	
Sheepfold capital repair and maintenance costs					10.68	0.61	
Mature female and male goat amortization					157.15	8.99	
Mature female and male goat capital interest					75.84	4.34	
Tool and machinery capital amortization					4.26	0.24	
Tool and machinery capital interest					1.91	0.11	
Fixed Costs					712.36	40.74	
Total Production Costs					1.748.75	100.00	
Gross production value					2.021.47		
Gross profit					985.08		
Net profit					272.72		
Gross profit/gross production value					48.73		
Net profit/gross production value					13.49		

Despite their being a source of animal products, supplementary income and employment for farmers without adequate capital and land in rural areas, the number of goats has been decreasing day by day. Certain internal and external factors have been effective in this decline. The first of the factors emerging from the within the enterprises is the tendency of the young population to migrate from the villages to cities as a result of insufficient agricultural land in the mountainous areas of Turkey, where animal husbandry is common. The external factors that were effective on the decline of goat breeding were the state ban on goat production in forest villages and insufficient support for goat production in villages without forests. The primary factor that was effective that led producers to stop producing Angora goat was the inadequate increase in mohair prices compared to the increase in milk and meat prices. The producers stated that the price of 1 kg of mohair was equal to the price of 1 g of gold in the 1950s and 1960s. The producers expressed that in the mentioned years they organized their credits and debts according to mohair shearing season as mohair prices were high in that period. It was also observed in the study that because of the mentioned decrease in mohair prices, producers hybridized angora goat to the ordinary goat. Thus producers shifted to hair goat breeding for its high meat yield. However, today it can be seen that the income obtained from mohair in Angora goat production has lost its importance as the result of the decrease in mohair prices.

A great majority of the agricultural enterprises in Turkey are small farms with an area of less than 5 ha. The share of gross profit within the total gross production value was 48.73% and the share of net profit was 13.49% of the angora goat production enterprises. For this reason, in order to meet the farmers' demand for animal products, to create alternative employment areas for farmers who have limited opportunity for plant production and to increase family income, it is necessary to support goat production in areas where breeding activities do not affect the existence of forests.

REFERENCES

1. **Devendra C:** Potential of sheep and goats in less developed countries. *J Anim Sci*, 51 (2): 461-473, 1981.
2. **Peters K, Drewes DG, Fichtner G, Moll S:** Goat production in low income economic units of selected areas in west Malaysia. *In*, Animal Research and Development, Institute for Scientific Co-operation, pp. 88-113, Tübingen, Germany, 1981.
3. **Tanrıvermiş H, Bülbül M:** The profitability of animal husbandry activities on farms in dry farming areas and interaction between crop production and animal husbandry: The case of Ankara province in Turkey. *Journal of Agricultural and Rural Development in The Tropics and Subtropics*, 108 (1): 59-78, 2007.
4. **Batu S:** Türkiye Keçi Irkları ve Keçi Yetiştirme Bilgisi. Ankara Üniv Vet Fak Yayınları, No: 4, Ankara, 1951.
5. **Shelton M:** Fiber production. *In*, Gall C, Eds: Goat Production. pp. 379-409, Academic Press, London, UK, 1981.
6. **Sell R:** Angora goat. Alternative agriculture series, Number 7, January 1993.
7. **Lupton CJ:** Prospects for expanded mohair and cashmere production and processing in the USA, *J Anim Sci*, 74, 1164-1172, 1996.
8. **FAO:** <http://faostat.fao.org/site/573/default.2007>. Accessed: 08.07.2009
9. **SIS:** 2001 Census of agriculture agricultural holdings (households). State Institute of Statistics (SIS), Prime Ministry Republic of Turkey, Publication No: 2924, Ankara, 2004.
10. **Açıl AF:** Ankara keçisi ve tiftiğin memleket bünyesindeki ekonomik önemi. Ankara Üniv Ziraat Fak Yayınları, No:182, Ankara, 1961.
11. **Akça H:** Ankara ilinde tiftik keçisi yetiştiriciliğinin ekonomik analizi. *Yüksek Lisans Tezi*, Ankara Üniv Fen Bil Enst, Ankara, 1992.
12. **Kıral T, Özçelik A, Fidan H, Yılmaz D:** Ankara ili tarım işletmelerinde tiftik üretiminin ekonomik analizi. Ankara Valiliği Yayınları, Ankara, 1996.
13. **Güven B, Özsar S, Sungur H, Pakdil N, Goncağül T:** Ankara keçilerinde ergenlik dönemi hormonal değişikliklerin incelenmesi. *Kafkas Üniv Vet Fak Derg*, 7 (2): 169-174, 2001.
14. **Göz Y, Aydın A, Yüksek N, Değer S:** Frequency of coccidia species in goats in Van province of Turkey. *Kafkas Üniv Vet Fak Derg*, 12 (2): 163-165, Kars, 2006.
15. **Ün Y:** Thornthwaite yöntemine göre konya iklimi. Devlet Meteoroloji İşleri Genel Müd Yayınları, No: 2000/04, Ankara, 2000.
16. **Turner J, Taylor M:** Applied farm management. Second Edition, Blackwell Science, UK, 1998.
17. **Açıl AF, Demirci R:** Tarım ekonomisi dersleri. Ankara Üniv Ziraat Fak Yayınları, No: 880, Ankara, 1984.
18. **Erkuş A, Bülbül M, Kıral T, Açıl AF, Demirci R:** Tarım ekonomisi. Ankara Üniv Ziraat Fak Eğitim Araştırma ve Geliştirme Vakfı Yayın No: 5, Ankara, 1995.
19. **Açıl AF:** Tarımsal ürün maliyetlerinin hesaplanması ve memleketimizde tarımsal ürün maliyetlerindeki gelişmeler. Ankara Üniv Ziraat Fak Yayınları, No: 665, Ankara, 1976.
20. **Kıral T, Kasnakoğlu H, Tatlıdil F, Fidan H, Gündoğmuş E:** Tarımsal ürünler için maliyet hesaplama metodolojisi ve veri tabanı rehberi. T.K.B. Tarımsal Ekonomi Araştırma Enstitüsü Yayınları, No: 37, Ankara, 1999.
21. **Kaymakçı M, Dellal G:** Türkiye ve Dünya'da Keçi Yetiştiriciliği. Meta Basım, İzmir, 2006.