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STRUCTURAL CHARACTERISTICS AND MAJOR PRODUCTION PROBLEMS OF SMALL RUMINANT ENTERPRISES IN NURDAĞI DISTRICT OF TÜRKİYE

KÜÇÜKBAŞ HAYVANCILIK İŞLETMELERİNİN YAPISAL ÖZELLİKLERİ VE BAŞLICA ÜRETİM SORUNLARI: GAZİANTEP İLİ NURDAĞI İLÇESİ ÖRNEĞİ

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Abstract

Small ruminant production is an important component of rural livelihoods and the supply of animal products in many parts of Türkiye. The aim of this study was to determine structural characteristics of small ruminant enterprises and to determine the major production problems of producers in Nurdağı district of Gaziantep Province. Primary data were collected through face-to-face surveys conducted among 100 small ruminant producers in 2024. Sample size was determined based on proportional sampling method. Descriptive statistics were used to analyze the data. The results show that small ruminant production in the study area is undertaken mainly by experienced producers under family based farming systems. Livestock production constitutes the main source of income for most households. Sheep farming is the most important component of herd structures. The most important production constraints were feed costs, support programs and climatic conditions. While most producers grow feed crops, on-farm feed production only represents a small share of total feed needs, reflecting continued reliance on purchased feed. Most farms have mixed feeding systems that include grazing and supplementary feeding. Most milk marketing is by direct sales through informal local channels. Prices for animals are generally considered high and prices for milk are moderate to low by producers. The results indicate that long-term sustainability of small ruminant enterprises could be achieved through increasing feed self-sufficiency, improving producer support systems and increasing production efficiency. The study gives useful information to policy makers and extension services trying to improve resilience and economic performance of small ruminant production systems.

Keywords: Small ruminants, production constraints, rural livelihoods, Türkiye

Özet

Küçükbaş hayvancılık, Türkiye'nin birçok bölgesinde kırsal geçim kaynaklarının sürdürülmesi ve hayvansal ürün arzının sağlanması açısından önemli bir üretim faaliyetidir. Bu çalışmanın amacı, Gaziantep ili Nurdağı ilçesindeki küçükbaş hayvancılık işletmelerinin yapısal özelliklerini ortaya koymak ve üreticilerin karşılaştıkları temel üretim sorunlarını belirlemektir. Araştırmanın birincil verileri, 2024 yılında 100 küçükbaş hayvancılık işletmesiyle yüz yüze gerçekleştirilen anketlerden elde edilmiştir. Örnek hacmi, oransal örnekleme yöntemi kullanılarak belirlenmiştir. Verilerin değerlendirilmesinde tanımlayıcı istatistiksel yöntemlerden yararlanılmıştır. Araştırma bulguları, çalışma alanındaki küçükbaş hayvancılık faaliyetlerinin büyük ölçüde deneyimli üreticiler tarafından aile işletmeciliğine dayalı üretim sistemi içerisinde yürütüldüğünü göstermektedir. İncelenen işletmelerin büyük çoğunluğunda hayvancılık temel gelir kaynağını oluştururken, sürü yapısında koyun yetiştiriciliği baskın üretim kolu olarak öne çıkmaktadır. Üreticilerin karşılaştıkları en önemli üretim sorunları; yem maliyetlerinin yüksekliği, destekleme programlarına ilişkin yetersizlikler ve iklim koşulları olarak belirlenmiştir. Üreticilerin önemli bir bölümü yem bitkisi yetiştirmesine rağmen, işletme içerisinde üretilen yem toplam yem ihtiyacının yalnızca sınırlı bir kısmını karşılamakta, bu

durum ise satın alınan yeme olan bağımlılığın devam ettiğini göstermektedir. İşletmelerin büyük çoğunluğunda mera otlatması ile ek yemlemenin birlikte uygulandığı karma besleme sistemi tercih edilmektedir. Üretilen sütün pazarlaması ağırlıklı olarak yerel ve kayıt dışı kanallar aracılığıyla doğrudan satış şeklinde gerçekleştirilmektedir. Üreticiler hayvan satış fiyatlarını genel olarak yüksek, süt fiyatlarını ise orta veya düşük düzeyde değerlendirmektedir. Araştırma sonuçları, küçükbaş hayvancılık işletmelerinin uzun dönemli sürdürülebilirliğinin yem açısından kendine yeterliliğin artırılması, üretici destekleme sistemlerinin güçlendirilmesi ve üretim etkinliğinin yükseltilmesiyle mümkün olabileceğini ortaya koymaktadır. Çalışma bulguları, küçükbaş hayvancılık işletmelerinin dayanıklılığının artırılması ve ekonomik performansının iyileştirilmesine yönelik politika ve stratejilerin geliştirilmesi açısından politika yapıcılara, tarımsal yayım kuruluşlarına ve ilgili paydaşlara önemli bilgiler sunmaktadır.

Anahtar kelimeler: Küçükbaş hayvancılık, üretim sorunları, kırsal geçim kaynakları, Türkiye

1. INTRODUCTION

Livestock production is one of the most important agricultural activities contributing to food security, rural employment and household income generation worldwide (Akash et al., 2022; Bonilla-Cedrez et al., 2023). In livestock production systems, small ruminant farming is particularly important in rural areas, given its relatively low investment needs, suitability for harsh environmental conditions and its ability to exploit marginal lands not suitable for crop production (Awad et al., 2023; Sharma et al., 2023; Washaya and Washaya, 2023). Small ruminants provide a multitude of outputs that contribute to household livelihoods and local economies through meat, milk, wool and manure (Wodajo et al., 2020; Kachave et al., 2025; Madegowda and Veerendrakumara, 2025).

Türkiye has a long history of small ruminant production and has suitable ecological conditions for sheep and goat farming (Ocak Yetisgin et al., 2022; Hanoğlu Oral and Yıldız, 2025). Small ruminants are especially important in semi-arid and mountainous regions with limited other agricultural enterprises (Kumar and Roy, 2013; Awad et al., 2023). In addition to meeting the domestic demand of animal products, the sector contributes to the efficient use of natural rangelands and the socio-economic sustainability of rural communities (Garmendia et al., 2022; CGIAR, 2026). However, the sector is plagued with several problems related to production efficiency, cost of inputs, animal health, marketing and management of natural resources (Chadda et al., 2024; Swaminathan et al., 2026).

In the recent years, livestock producers have been increasingly concerned by rising feed prices, labor shortages, climatic variability and increasing production costs (Ropp, 2026; Wudie et al., 2026). Such challenges can have an adverse impact on farm profitability and the long-term sustainability of small ruminant enterprises (Lizarralde et al., 2025). The development of efficient agricultural policies and support programs requires a knowledge of the structural characteristics of livestock farms and the identification of the main constraints faced by producers.

Previous studies have looked at different aspects of small ruminant production such as its contribution to rural livelihoods, value chain organization, technical and economic performance, farm management practices and producers' access to institutional services (Armson et al., 2020; Conteh et al., 2020; Kaumbata et al., 2020; Kassie et al., 2021; Abdulai, 2022; Dubeuf et al., 2023; Matovu and Alçiçek, 2023; Arnold et al., 2024; Awad et al., 2024; Chadda et al., 2024). Although these studies offer key evidence on the economic and social functions of the sector, many of them focus on one aspect of production or are carried out at large regional and national levels. Integrated district-level evidence on enterprise structure, management practices and production constraints is still limited, especially in southeastern Türkiye. Thus, local studies are needed to identify the conditions for each region and to provide a better empirical basis for policies on livestock development.

Small ruminant breeding is one of the main livestock activities in the Nurdağı district of Gaziantep province and is widespread in the district. Its prevalence is a reflection of the importance of sheep and goat production in the local agriculture structure and rural economy (GMM, 2026). According to the small ruminant statistics of the TSI (2025), Nurdağı district accounts for 9.84% of the total small ruminant population in Gaziantep Province. However, little is known about the production structure, management practices and constraints of small ruminant producers in the district. The aim of this study is to determine the structural characteristics of small ruminant enterprises and to determine the

basic production problems faced by producers in Nurdağı district. The findings are expected to provide useful information to policy makers, extension services and rural development stakeholders seeking to improve the sustainability and economic performance of small ruminant production systems.

2. MATERIAL AND METHOD

The main data of this study were collected in 2024 through face-to-face surveys with small ruminant producers in the Nurdağı district of Gaziantep Province, Türkiye. The target population was 439 registered small ruminant firms (RTMAF, 2024). Sample size was determined using proportional sampling approach with 7.5% margin of error and 90% confidence level. The minimum necessary sample size of 95 producers was obtained by using the Equation (1) by proportional sampling method (Newbold, 1995; Miran, 2021).

$$n = \frac{Np(1-p)}{(N-1)\sigma_{p_x}^2 + p(1-p)} \quad (1)$$

where n is the sample size, N is the population size, p is the population proportion (assumed to be 0.50), and σ^2_{px} is the variance of the population proportion.

To improve the reliability of the study and compensate for possible data losses, a total of 100 producers were interviewed. The questionnaire included questions on producers' socio-economic characteristics, farm structure, flock characteristics, feeding and grazing practices, animal health management, marketing activities, and the major production problems encountered in small ruminant farming. In addition, producers were asked to evaluate the importance of various production constraints using a five-point Likert scale.

The collected data were analysed using descriptive statistical methods, including frequencies, percentages, means, and standard deviations. The results are presented in tables and discussed to describe the structural characteristics of small ruminant enterprises and identify the principal production problems faced by producers in the study area.

3. RESULTS AND DISCUSSIONS

3.1. Socio-Demographic Characteristics of Small Ruminant Producers

Table 1 shows Sociodemographic characteristics of small ruminant producers in the Nurdağı district. The results suggest that production is primarily the task of seasoned, older, married, male producers with relatively low levels of formal education. Fully three-quarters of the respondents had more than 20 years of farming experience, half were at least 51 years old, 98% were male, and 95% were married. These results show that the main producers of small ruminants in the study area are still family-based farms with accumulated practical knowledge.

Similar profiles of the producer have been reported from several Turkish localities. Çiftçi and Kopuzlu (2025) determined that the primary characteristics of producers in the Yavuzeli district of Gaziantep Province were that they were predominantly male and had relatively low educational backgrounds. The mean producer age was 45.3 years and half of the producers were ≥51 years of age, indicating a relatively older producer profile in Nurdağı in comparison with the present study. Similarly, Çetinkaya et al. (2023) found that most of the producers in Kahramanmaraş were married and had very high experience. They were also more educated, with more than half of the respondents being high school graduates. Similar patterns of advanced producer age and low formal education were also reported in Van (Yıldız and Aygün, 2021), Hakkâri (Demir and Tuncer, 2023) and Afyonkarahisar (Serttaş et al., 2023), where the largest education group was primary school graduates and the average age of producers was about 48-49 years. To summarize, the findings of this study show that experienced family farmers are still the major suppliers of small-scale ruminant farming in Türkiye. However, the

somewhat older producer profile of Nurdağı may be a problem for long term generational renewal and the application of modern production technology.

Table 1. Socio-demographic characteristics of small ruminant producers in Nurdağı district

Variables	Category	%
Age	≤40	17
	41-50	33
	≥51	50
Gender	Male	98
	Female	2
Marital status	Married	95
	Single	5
Educational level	Primary school	52
	Secondary school	34
	High school	14
Farming experience (years)	≤20	28
	21-40	61
	≥41	11

3.2. Economic Characteristics of Small Ruminant Producers

Table 2 shows the economic characteristics of the small ruminant producers in Nurdağı district. The main source of income for producers is livestock production, 84% of which stated that they did not earn any income from crops. While 43% of the respondents had income from sources other than farming, the bulk of the households' income was still highly dependent on livestock activities, pointing to rather specialised production structure. The share of producers with off-farm income was remarkably close to the 42.86% reported by Ünal and Dellal (2023), implying that a large proportion of the livestock producing households in various parts of Türkiye depend on off-farm income as a supplementary source of income. Çiftçi and Kopuzlu (2025) stated that this structure was different from the Yavuzeli district where 64% of businesses also produced crops. Furthermore, the level of integration in formal agricultural assistance mechanisms was also low, considering that 60% of the producers included in the present study were registered in the Farmer Registration System.

Table 2. Economic characteristics of small ruminant producers in Nurdağı district

Variables	Category	%
Annual livestock income (TRY)	≤100.000	5
	100.001-500.000	57
	500.001-1.000.000	33
	≥1.000.001	5
Annual crop income (TRY)	None	84
	≤100.000	8
	100.001-300.000	6
	≥300.001	2
Annual off-farm income (TRY)	None	57
	≤50.000	4
	50.001-400.000	38
	≥400.001	1
Farmer Registration System (FRS) registration	Yes	60
	No	40

3.3. Herd Structure and Milk Production Characteristics

The findings revealed that sheep are the major component of herd structures in the study area, which indicates the importance of sheep husbandry in small ruminant production systems. The proportion of milking animals in both sheep and goat herds indicates that milk production is conducted alongside other production objectives. Goats produce more milk per animal than sheep, but flocks of sheep are larger and have more milking animals. Average sheep herd in the present study was larger and average goat herd was smaller than Çetinkaya et al. (2023). Moreover, the daily average milk yield of sheep (0.9 L) was lower than 1.2 L reported by Çetinkaya et al. (2023) in Kahramanmaraş. However, the mean daily yield of goat milk (1.9 L) was higher than 1.65 kg per goat reported by Engindeniz et al. (2018). These differences are probably related to differences in breed composition, feeding practices, herd management and regional production conditions. To summarize, the results show a mixed small ruminant production system where sheep are more numerous in terms of herd size and goats have a higher milk yield per animal (Table 3).

Table 3. Herd structure and milk production characteristics of small ruminant enterprises in Nurdağı district

Variables	Category	Mean
Number of animals	Goat	98.3
	Sheep	159.4
Number of milking animals	Goat	54.7
	Sheep	70.9
Milk yield (L/day)	Goat	1.9
	Sheep	0.9

3.4. Production Motivations, Constraints and Animal Selection Criteria

Table 4 shows the reasons for involvement in small ruminant farming by the producers, the main production constraints, animal selection criteria, adequacy of disease control measures and sources of labour. The main motivations for production were profitability and relatively stable product prices, and ease of production was less important. High feed prices were the biggest problem in production followed by climatic conditions and lack of support programs. This result agrees with Gül et al. (2022), who found that 63.23% of sheep breeders in Aksaray stated that the expensive feed was the most important production problem. Similarly, Gökmener and Öztürk (2022) identified high feed prices, high infrastructure costs, low product prices and difficulties in finding shepherds as the major constraints and Mohamud and Çevrimli (2023) found that feed expenses accounted for 46.1 % of total production costs in sheep enterprises. In the same way, Ünal and Dellal (2023) reported that high feed prices and pasture problem were definitely important problems for breeders, and Demir and Tuncer (2022) reported that high feed prices and poor pasture quality were among the most important problems faced by producers.

Meat yield, disease resistance, fertility and milk yield were the main animal selection criteria, whereas the purchase price was of less importance. Also, 84% of producers rated disease control as at least moderately adequate. In 96% of the enterprises family labour was the main source of labour. This rate was higher than the 66.6% reported by Gökmener et al. (2025) for sheep farms in Uzundere, and Demir and Tuncer (2023) found that 74% of small ruminant enterprises in Hakkâri depended on paid shepherds. These variations imply that the structuring of labour is very different from one region to another, although family-based production still dominates in Nurdağı.

Table 4. Production motivations, constraints and animal selection criteria of small ruminant producers in Nurdağı district

Variables	Category	Mean
Reasons for engaging in livestock production[1]	More profitable	0.81
	Stable prices	0.80
	Easier production	0.47
	Lower labour requirement	0.65
Constraints during production[2]	High feed prices	3.89
	Insufficient support programs	3.28
	Climatic conditions	3.19
	Diseases	2.58
	Labour shortage	1.07
	Transportation	0.34
	Marketing problems	0.25
Animal selection criteria[2]	Disease resistance	3.24
	Milk yield	3.11
	Meat yield	3.43
	Fertility	3.20
	Price	2.05
Variables	**Category**	**%**
Adequacy in disease control	Completely inadequate	2
	Slightly adequate	14
	Moderately adequate	59
	Completely adequate	25
Labour source	Family labour	96
	Hired labour	4

[1] 0 = Strongly disagree, 1 = Slightly agree, 2 = Moderately agree, 3 = Agree, 4 = Strongly agree. [2] 0 = Not important, 1 = Slightly important, 2 = Moderately important, 3 = Important, 4 = Very important.

3.5. Milk Marketing and Producers' Price Perceptions

Table 5 shows the milk marketing channels and producers' perceptions of animal and milk prices. The findings show that milk was predominantly sold via direct sales to neighbors (80%) and a small proportion of producers sold milk to dairy processing plants (18%) or local markets (2%). These results show that milk marketing in the study area is mainly through short marketing channels and local informal trade rather than organized marketing systems. Similar marketing patterns have been noted elsewhere in Türkiye. It was found that about 70.5% of sheep and goat milk was processed into cheese before sale, indicating that direct marketing of dairy products is still common among small-scale producers (Serttaş et al., 2023). Similarly, Gül et al. (2022) reported that sheep breeders in Aksaray mostly produced milk as cheese and sold it through retail sales. In terms of price perceptions, the majority of the producers in the present study considered current animal (56%) and milk prices (60%) to be moderate, relatively few considered them to be expensive. The results indicate that local marketing practices are still dominant in milk commercialization in Nurdağı and the linkages to formal dairy processing channels are limited.

Table 5. Milk marketing channels and producers' perceptions of animal and milk prices in Nurdağı district

Variables	Category	%
Milk marketing channels[1]	No milk sales	5
	Dairy processing plant	18
	Neighbours	80
	Market	2
Perceived level of animal prices	Cheap	8
	Moderate	56
	Expensive	30
	Very expensive	6
Perceived level of milk prices	Cheap	32
	Moderate	60
	Expensive	8
	Very expensive	0

[1] Multiple responses were allowed.

3.6. Feeding Practices and Water Availability in Small Ruminant Production

Water availability, feed production and feeding strategies for small ruminant farmers in the Nurdağı district are given in Table 6. Only 16% of the producers grazed on rangelands alone, but most (83%) practiced combined grazing and stall feeding; Additionally, 59% of producers produced their own feed, supplying an average of 40.5% of their feed requirements through on-farm production. These findings are generally consistent with the previous studies in Türkiye. Gül et al. (2022) determined that sheep producers in Aksaray generally preferred to mix grazing with supplementary feeding. Gökmener et al. (2025) found that 66.7% of sheep farms in Erzurum provided their own feed. The animals were fed with concentrate and roughage, especially in winter and were mostly grazed on pastures (Serttaş et al., 2023). Most producers (86%) reported no problems or only minor problems (51%) with access to water and this indicates that access to water was not considered a significant production constraint in the research area.

Table 6. Feeding practices, feed production and water availability of small ruminant producers in Nurdağı district

Variables	Category	%
Water availability problems for animals	No problem	35
	Minor problems	51
	Moderate problems	12
	Frequent problems	2
Feeding method	Stall feeding	1
	Grazing on rangelands	16
	Both	83
Feed production	Yes	59
	No	41
Feed requirement met by own production (%)		40.50

4. CONCLUSION AND RECOMMENDATIONS

In Nurdağı district, small ruminant production remains an important part of the livelihoods and agricultural sustainability of rural areas. The findings reveal a sector of experienced producers, predominantly male, who depend mainly on livestock production for their livelihoods. For some producers, off-farm income is contributing to household earnings, but for the majority, livestock remains the primary economic activity with crop production playing only a limited role. Production systems are mainly based on the combination of grazing and stall feeding, more than half of the producers are cultivating part of their own feed requirements. Family labour remains the main source of labour and milk marketing is mainly through direct sales to neighbours, indicating continuity of

traditional systems of production and marketing. High feed prices were the most important production constraints followed by inadequate support programs and climatic conditions.

To secure the long-term sustainability of the sector it will be necessary to reduce production costs, especially feed costs. Farm resilience can be improved through increased on-farm forage production, pasture management, and feed conservation practices that reduce the dependence on purchased feed. Production efficiency can be further enhanced by strengthening extension services, including practical training on forage production, breeding, animal health and farm management. “The impacts of increasing input costs could also be reduced through additional targeted financial support and help for producers to access agricultural support programmes.

Better producer organisations and cooperative structures would enhance bargaining power for producers, ease access to technical information and government support, and result in more organised milk marketing systems. Improvements in this area could lead to greater value addition and more stable access to markets. Therefore, future policies for rural development should take an integrated approach, combining economic support, technical assistance, sustainable management of feed resources and climate adaptation strategies. These measures would not only be helpful to increase the profitability of small ruminant enterprises but also to the long-term sustainability and resilience of the livestock production systems in Nurdağı district and similar production environments.

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