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Mediterranean forest villages animal breeders and production system

Abstract

With an area of 78 million hectares, Turkey has an ecologically rich diversity. Within this richness, forests, which cover 29.4% of the country's area, have an important place in terms of species and composition. Adana province has a total forest area of 752.339 ha, of which 496.698 ha is normally closed and 255.641 ha is closed with gaps. The main material of the study consists of primary data obtained from face-to-face interviews with 120 forest villagers engaged in animal husbandry in 18 forest villages of Adana province. Livestock breeding is widespread in forest villages, even if it does not occupy a very large place among livelihoods. 43%, 21% of the respondent's state that they are engaged in animal husbandry continuously and 32% at variable times. In terms of animal type, 30% of the households have cattle, 60% have ovine, 30% have beehives and 95% have poultry. It is understood that livestock yields in the region are very low and losses due to breeding errors are very high. It is possible to increase the contribution from animal husbandry with on-site training and improvement practices to be provided to the people of this region.

Keywords: Adana, forest villages, animal husbandry

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Introduction

Today, forests are of great economic, ecological, and sociocultural importance. For this reason, they have gained a global character and great efforts are being made for their sustainable management.

Forests are among the indispensable common values of the world with their social benefits such as biodiversity, carbon storage, being a source of oxygen, regulating surface and ground waters, having a positive effect on climate, preventing erosion, as well as wood and forest products needed at every stage of human life. Forest ecosystems require sustainable management at both national and global levels. In the sustainable management of forest resources, forest management plans should be organized, their implementation should be monitored and evaluated for the multi-purpose utilization, protection, and development of economic, ecological, and sociocultural functions of forests with an integrated approach. As an implementation of Article 26 of the Forestry Law No. 6831, which states that "... the extraction from the State forests shall be carried out by the State by the principles to be determined by the Ministry of Agriculture and Forestry and according to the Forest Management Plans.", all forests of the country are operated with forest management plans. These plans are made by the General Directorate of Forestry, Department of Forest Administration and Planning based on the Forest Management Directorate for certain periods. In general, compared to the past situation, the area and wealth of today's forests and their annual current increments are increasing. In recent planning and implementation activities, the consideration of other product and service functions of forests other than wood production has been effective in this change.

For a forest to be planned and operated, the internal and external factors that interact with the forest ecosystem should be known and these factors should be taken into consideration when planning. One of the most important of these factors can be called the "human factor". There are a total of 20,721 forest villages in Turkey, 7,344 of which are in forests and 13,377 of which are on forest edges.[1] A forest village is defined as a village within or adjacent to a forest, and a forest villager is defined as a person who is registered to the population of a forest village and permanently resides in these villages. Forests are organically connected to the forest villagers who use the forest interior and forest edges as settlements, and this is one of the factors that should be taken into account in the planning and operation of forest resources. When forest villages are examined; it is seen that most of them are far from cities, established in mountainous and forested areas; they cannot benefit sufficiently from services such as health, education, communication, and transportation. The inevitable result of the limited income earned from traditional agriculture and animal husbandry in forest villages is poverty.[1,2] Local people, defined as forest villagers, have lived intertwined with forest resources from past to present in line with the local culture and habits they have developed and have benefited from these resources for their livelihoods. In parallel with the social, economic, ecological, and cultural changes in the world and the country, forests, and forestry are also changing and even transforming.[3] The proportion of forest villagers, which constituted 19.38% of the country's population in 1967, decreased to 8.38% in 2019. The reasons such as the settlements of forest villages are mostly on mountain ridges, the distances to the provincial centers are long, the support of the forestry organization is insufficient, and the rural industry is not developed have been effective in the migration of forest villagers.[3]

Forest villages are generally established at high altitudes and on sloping lands unsuitable for agriculture. This structure makes it difficult to live in forest villages and increases dependence on forests. Inadequate living conditions in terms of social, cultural, and economic aspects bring about significant pressures on forest resources. For this reason, various policies are implemented to solve the problems of forest villagers, eliminate the negative effects of villagers on forest resources, and ensure the development of forest villagers.

Material and methods

Adana province has regions that can be defined as mountainous, lowland and transitional regions. Transhumance is common in the region; therefore, summer and winter populations in villages vary. Interviews with reeve revealed that the summer and winter populations of villages vary greatly. Looking at the seasonal change in village populations, it is understood that in 85% of the villages,

summer populations are higher than winter populations. The livestock structure of Adana province also varies according to the geographical and climatic conditions of the region. Looking at Adana province in general, goat has realized the highest development with an increase of 181% in the last 5 years. There was a 51% increase in sheep (local). The number of sheep (merino) declined by 36% in the last 5 years. There are 467 villages in Adana province, 314 of which fall under the definition of forest villages.[3] The surveys were conducted in Kozan and Feke villages, which have the highest number of forest villages. The number of villages according to Adana districts is summarized in Table 1 (Figure 1) (Figure 2).

Table 1 Age, gender, educational status, and livelihoods of the respondents

Age groups	Ratio	Education	Ratio	Cooperative membership	Ratio	Livelihood	Ratio	Reason for keeping livestock	Ratio
26-30	5,0	Primary school	5,0	Yes	10,0	Agriculture revenues	23	Addition-al work	40
31-40	5,0	Lycee	15,0	No	90,0	Pension	18	Home needs	20
41-50	40,0	Middle School	45,0			Salary/ Day Wage	10	Cash needs	20
50+	50,0	University	35,0			Social assistance	15	Emergency sales	20
						Livestock farming	32		
						Forest	2		
Total	100,0		100,0		100,0		100,0		100,0

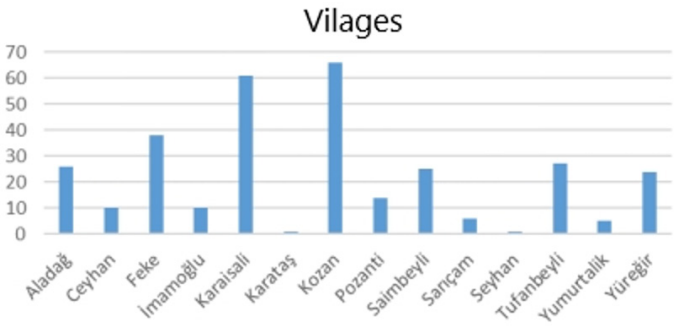

Figure 1 Number of forest villages in Adana province districts.

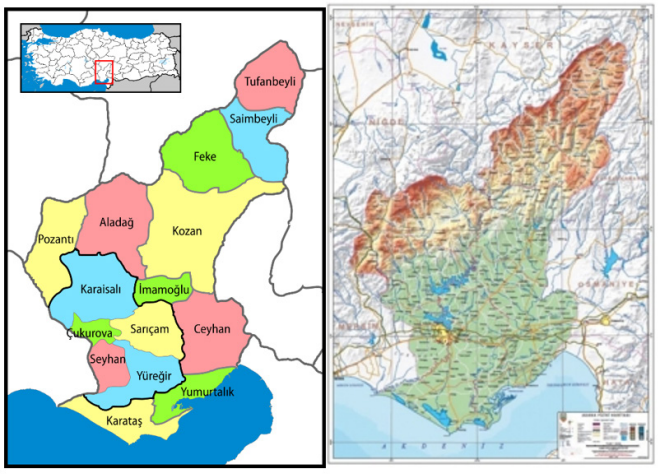

Figure 2 Districts of Adana province.

The main material of the study consists of primary data obtained from face-to-face interviews with 100 forest villagers engaged in animal husbandry in 18 forest villages in Adana province. In the preparation of the survey questions, a literature study was conducted and the survey questions were prepared through interviews with the breeders. The main population of the research was primarily composed of people engaged in animal husbandry in the mountain villages of the region voluntarily. Considering that the population of forest villagers in the region, which is the universe of the research, is 86558, it can be said that a sample of this size represents the research universe with a margin of error of ± 4% within a 95% confidence interval. Of the villages in the region, 87% are in the category of in-forest villages and 13% are in the category of adjacent villages. In the villages reached within the scope of the research, this ratio was 75% to 25%.

The prepared questionnaires were applied through face-to-face interviews. The questionnaire forms were organized in a way to meet the objectives of the research in a way not to exceed 20 minutes with sub-headings including questions about socio-demographic structure, livestock breeding status, and marketing. The prepared questions were first applied with a group of volunteers and after determining the comprehensibility of the questions, the necessary corrections were made and applied to the target group. The first part of the questionnaire includes demographic and economic information about the sample community in the study area. This was followed by answers to questions on livestock husbandry status and marketing perspectives. A total of 41 questions were asked for these purposes and the information compiled with these questions is given below in a comparative manner.

The results of the 80 participants who responded to the questionnaires were evaluated by creating cross-tabulations using SPSS (for Windows 6.01) statistical program and MS Excel program.

Results and discussion

The distribution of the answers of the respondents to the questions on age, gender, educational status, and livelihoods in forest villages are summarized in Table 1.

The effect of migration from villages to urban areas is also effective in the structure of forest villages as in many other areas. With the decrease in the population in the villages, it has turned into villages where the average age is high and retired people live, and the villagers who have migrated have temporarily come to visit and harvest crops in the summer months. It is stated that those who live in the villages permanently are an elderly population with a majority of women.[5] In addition, the education level of the elderly population still residing in the village is very low. In these villages, access to education and health services has become very difficult, agricultural areas cannot be cultivated, and livestock breeding is no longer practiced.[3,5] There are also problems in the functioning of cooperatives in forest villages and serious trust problems in the view of mountain village farmers

towards cooperatives.[6] Agricultural income constitutes a large part of the income of forest villages. Agricultural income is the main source of income for 26% of households, while pension is the main source of income for 24% of households. These are followed by salary/wages, social assistance, and livestock production. When asked why forest villagers keep livestock, they stated that they do it as an additional job and a continuous source of income to meet domestic consumption needs. When the respondents were asked about their reasons for raising livestock, 40% of them stated that they do it as additional work to contribute to the family and that they generally use the family labor force. Livestock breeding is seen as an indispensable branch of production for the livelihood of forest villagers. However, the way of production is carried out in the form of additional work and the form of ancestors and grandfathers. At this point, yields remain low and the desired contributions cannot be achieved due to animal diseases and yield losses. Young people do not embrace the village, they move to urban life to find a job and get an education and then do not want to return to the village. The average age of the villagers is around 50 and it is understood that the last young people are planning to complete their education and settle in the city.

The distribution of the answers given by the forest villagers who participated in the survey to the questions related to land status and fodder plant production is summarized in Table 2.

Table 2 Responses related to land status and crop and animal production

Land availability	Ratio	Fodder production	Ratio	Animal Production	Ratio	Animal	Ratio	Reasons for decrease	Ratio
None	15	No	85,0	No	27,7	Decreased	60	Labor shortage	60
10-20 da	35	1,00	15,0	Yes	43,7	İncreased	20	Feed, medicine, veterinary	23
20-30	30			From time to time	28,6	Unchanged	20	Forced sales	10
40+	20							Diseases	7
Total	100,0		100,0		100,0		100,0		100,0

The rate of forest villages with no land is 15%. The small amount of land suitable for agriculture causes the villagers living in forest villages to sustain their livelihoods under difficult economic conditions. Alkan and Toksay.[7] report that the proportion of forest villagers with no land is 10% and the average amount of land available for agriculture in forest villages is 25 decare per household. Forest villages are generally located at higher altitudes and have more difficult geographical and climatic conditions compared to other villages. The fact that agricultural areas in forest villages are scarce and hilly, yields are low, and access to markets is generally limited has a negative impact on life, resulting in permanent and/or seasonal migration movements from forest villages. While 27.7% of the respondents do not own cattle, 28,6% stated that they keep cattle from time to time by buying and selling according to need. This is an indication that animal husbandry in forest villages is mostly for subsistence production. 60% of the respondents stated that the number of animals has decreased a lot in the last 20 years and epidemic diseases have brought the poultry group to the point of extinction. According to 2021 data, there are more than 12 million goats in Turkey.[8] This number started a dramatic decline starting in the nineties and dropped to 5 million in 2009. Subsequently, support for small ruminant husbandry, registration, and organization practices contributed to the goat population reaching 12 million.[9]

The reasons for the decrease in livestock production were stated as lack of labor, lack of money to cover feed, medicine, veterinary expenses, forced sales, and diseases. People living in forest villages generally release their animals to the natural areas around the village and generally have to buy feed to feed their few animals. From time to time, it was also stated that the projects distributed to support forest villagers, such as roaming chickens or feed support projects, are important in this sense.

The distribution of the respondents' answers to the questions on the number of animals is summarized in Table 3.

Table 3 Answers to the questions about the number of animals

Animal breeding experience	Ratio	Number of Cattle	Ratio	Number of ovine animals	Ratio	Number of beehives	Ratio	Poultry	Ratio
There is	60	YOK	70,0	,00	40,0	,00	70,0	,00	5,0
No	40	7,00	5,0	8,00	5,0	20,00	5,0	20-Oct	60
		10,00	5,0	54,00	5,0	28,00	5,0	20-50	10
		40+	20,0	100,00	5,0	50,00	5,0	50-100	20
				170,00	5,0	60,00	10,0	100+	5
				200,00+	40,0	300,00	5,0		
Total	100,0		100,0		100,0		100,0		100,0

The rate of those who stated that they had experience in animal husbandry was 60.0% and it was stated that they generally obtained this experience from their family and close environment. Livestock breeding is widespread in forest villages even if it does not occupy a very large place among livelihoods. 43.21% of the respondents state that they are engaged in animal husbandry continuously and 32% at variable times. In terms of animal type, 30% of the households have cattle, 60% have small cattle, 30% have beehives and 95% have poultry. The proportion of forest villagers with no cattle, small cattle, and beehives is 70% and the proportion with no poultry is 5%. The number of forest villagers with 40 heads of cattle was found to be 20% and the rate of those with 7 to 19 heads of cattle was 10%. As 40 heads

of cattle, it was stated that the number of animals of different ages and sexes, including calves, heifers, cows, and tots, and the number of milking animals was less. The number of forest villagers with more than 200 heads of small ruminants is 40% and the ratio of those with 8 to 170 heads of animals is 20%. Regarding the number of beehives, the number of forest villagers with more than 60 beehives was found to be 15% and the ratio of those with 20 to 50 beehives was found to be 15%.

The distribution of the answers given by the forest villagers to the questions about the way of utilizing the surplus of the animal products they produce is summarized in Table 4.

Table 4 Their answers to the questions about the way of utilization of animal products

Where did she learn to make cheese?	Ratio	Form of product evaluation	Ratio	Cheese making	Ratio	Product sales	Ratio
Form mother	65,0	In the family	25,0	Woman	75	Woman	30
Neighbor	30,0	Relatives in the city	30,0	Child	20	Child	20
Relatives	5,0	Order , sales	15,0	Male	5	Male	50
		Highlanders	30,0				
Total	100		100		100		100

When asked where they learned cheese making in forest villages, 65.0% stated that they did not take any course or training and in general, 65.0% stated that they learned from their mothers, 30% from neighbors, and 5% from their relatives. Similarly, Göncü et al.[10] stated that 56.0% of the respondents stated that they received training on animal husbandry from their families. It is understood that 25% of the animal products produced in forest villages are utilized within the family, 30% by relatives in the city, 15% by order sales to acquaintances, and 30% by direct sales to incoming transhumants. However, it was stated that if the animal products produced in general are more than the family needs, the products are not marketed and are usually sent to relatives in big cities. In the study conducted by Göncü et al.[10] in the Diyarbakır region, it was stated that 50% of the animal products were purchased by collectors and put on the market, 6.6% were sold to cooperatives, 1.2% group did not respond, the rest were consumed by the family, and the rest were purchased as a mixture by neighbors, collectors, and cooperatives. It is understood that 75% of the animal products produced are cheesed by women at home and 50% are marketed by men.

The distribution of forest villagers' answers to the questions about who is responsible for animal care is summarized in Table 5.

Table 5 Responses to the questions about who is responsible for animal care

Where did she learn to make cheese?	Ratio	Form of product evaluation	Ratio	Cheese making	Ratio	Product sales	Ratio
Form mother	65,0	In the family	25,0	Woman	75	Woman	30
Neighbor	30,0	Relatives in the city	30,0	Child	20	Child	20
Relatives	5,0	Order , sales	15,0	Male	5	Male	50
		Highlanders	30,0				
Total	100		100		100		100

In forest villages, it is understood that 70% of children are responsible for cleaning animal shelters, 50% of women and 30% of children are responsible for feeding animals, 85% of women are responsible for milking animals and 55% of men and 40% of women are responsible for animal diseases. In forest villages, 80.7% of the animals go out to graze. This rate was higher than the 86.7% reported by Göncü et al.,[11] 68.6% by Bakır and Han[12] 77.2% by Han,[13] and lower than the 99% reported by Kaygısız and Tümer.[14]

The distribution of the answers given by forest villagers to the questions about animal product evaluation is summarized in Table 6.

Table 6 Answers to the questions about animal product evaluation

Marketing challenge	Percentage	These products are the basis of family livelihood	Percentage	Products find buyers with good prices	Percentage
Yes	10	Yes	35	Yes	45
No	70	No	20	No	5
Undecided	20	Undecided	45	Undecided	50

When the answers they gave to the questions about the evaluation of animal products were analyzed, 70% stated that they did not have marketing problems, while 20% stated that they were undecided. While 35% of forest villagers say that animal husbandry is the basis of family livelihood, 20% say no, it is not the basis of family livelihood. The rate of those who think that the products produced find buyers at a good price is 45%, while those who are undecided are at the level of 50%.

Conclusion

Livestock and agricultural activities are seen as an indispensable production branch for the livelihood of forest villagers in countries where a large part of the national income is based on agricultural and animal income, including countries with similar ecology. However, in regions where the application of modern breeding and feeding techniques is difficult, production is carried out with the old method, therefore yields remain low, and the desired contributions cannot

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be provided due to animal diseases and yield losses. Especially in livestock activities that require labor, since the young population moves away from the region and does not embrace the village, they move to urban life to find work and receive education, these regions cannot reflect their real potential due to limited labor force. It is reported that livestock yields are very low in the region and losses resulting from breeding errors are very high. The general assessment is that it is thought that it will be possible to increase the contribution provided by livestock by providing on-site training to the people of this region, carrying out activities with animal species suitable for ecology, and increasing the financial support amounts of the states to prevent the flow of young population, especially for difficult ecological regions.

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Conflicts of interest

The authors declare no conflict of interest in writing the manuscript.

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