



STRUCTURAL FEATURES OF SHEEP FARMS IN ORDU PROVINCE

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Abstract: This study was carried out to determine the structural characteristics of sheep breeding, herd owners, and general characteristics of sheep breeding enterprises in Ordu province by survey method. There are 1883 sheep farms in Ordu, and it has been determined that in 1116 (59.27%) of these farms, the number of sheep is below 100 heads, the number of animals per farm, in general, varies between 1-3242 heads, and the average number of animals per farm is 102 heads. The study data were obtained from 76 farms selected according to the stratified sampling method among 100 animals or more farms. Of the 76 breeders surveyed, 59.21% graduated from primary school, 14.47% from secondary school, 22.36% from high school and 3.95 bachelor degrees. It has been determined that the level of education does not make a difference in production, management, and the attempt to do additional work ($\chi^2=9.666$, $P=0.139$). In the study, 26.3% of the herd owners are engaged in sheep breeding as a source of livelihood, while the remaining 73.7% are involved in sheep breeding together with other business areas. In conclusion, it was determined that the level of education, experience, age, and additional work status of the breeders were not effective on the size of the flock, the number of lambs obtained per ewe, lamb survivability and business management in sheep farms. As a result, for sheep farms to reach a more profitable, innovative and sustainable situation in Ordu province, those with less than 100 sheep per farm should be encouraged to increase the number of animals and the problem of finding a shepherd should be resolved.

Keywords: Farmer, Education level, Sheep farm, Herd size, Management

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1. Introduction

The characteristics of the herd owner such as education, health, age, partially gender, economic situation, whether she is open to innovations, and turning risks into opportunities are critical in animal husbandry. Because these characteristics are among the factors affecting the size of the enterprise to be established, the production amount of the enterprise, the production quality, competitiveness of the enterprise with other enterprises and the sustainability of the enterprise. It is an unpleasant fact that the owners of small ruminant herds in general are inferior to other livestock breeders in terms of the mentioned characteristics above. However, this should not be absolutely understood as the fact that sheep-goat breeders are not intelligent and their grasping skills are low.

Sheep breeding is carried out in the form of family businesses throughout Turkey and with the participation of all members of the family. The manager of the business is usually the dominant male (father). In addition, it is seen that there has been an increase in the number of agricultural enterprises dominated by women in recent years. In the research, it is reported that women-dominated enterprises are more sensitive to the environment, and they focus on organic production and sustainability of enterprises (Unay-Gairhard and Bojnec,

2021).

Family businesses in agricultural production are the basic building blocks of the society; which are generally located on small lands; with very low capital and investment, making significant contributions to both their own livelihoods and the country's economy by making vegetable and animal production by making use of their own family workforce (Mujica and Riveros, 2021). It is a necessity for such families to deal with both plant and animal production in many parts of the world (Olaizola et al., 2015). Plant and animal production of the family in rural areas to meet their own needs is essential in terms of socio-economic, socio-political, and food security, such as preventing migration from the countryside to the city bringing small areas into the economy. On the other hand, for producers with minimal resources, sheep are among the most ideal and beneficial animals, having a very significant impact on their income, social status, and even the local environment (such as assessing the vegetation among the hazelnut trees and fertilizing the soil (Park and Deller, 2021). Questionnaires are valuable studies that can provide valuable clues in defining and solving problems if they are well planned, selecting suitable subjects in the target, and obtaining the correct answers. Since sheep breeding has an important place in rural settlement, employment,



animal husbandry, and the country's economy, but it is not in the desired position, policies and programs are carried out to strengthen its structure by authorities. For this reason, this study was carried out to determine the general characteristics of herd owners and enterprises dealing with small cattle breeding in Ordu and contribute to the achievement of sheep breeding to the position it deserves.

2. Materials and Methods

2.1. Identification of Businesses in the Study

Sheep farms are divided into four groups (100-175, 176-250, 251-350, and those with more than 351 animals) according to the number of animals they have. The number of farms (sample size) used in the study was determined according to the stratified sampling method (Işık, 2006) from 1883 sheep breeding enterprises (Anonim, 2022). The study was carried out as a face-to-face survey study in 76 of 1883 sheep farms in Ordu province in Türkiye and aimed to reveal the owners and enterprises engaged in sheep breeding. This survey study did not include businesses or owners with less than 100 sheep.

In our survey study, when it was determined that the sheep herding enterprises had other agricultural and commercial activities, we grouped the enterprises according to the activities they carried out to demonstrate the success in sheep breeding and formed three groups. We named only those who do animal husbandry as the 1st group, those who do animal husbandry and hazelnut production, which is common in the region, as the 2nd group, and the enterprises engaged in both animal husbandry hazelnut production and commercial activities as 3rd group.

2.2. The Ability of the Herd Owner to Manage Her Business

This concept can be expressed as the ability of the herd owner to manage the animals on his farm in a way that makes a reasonable profit. The size of the flock, the number of male and female animals in the herd, and the number of lambs obtained from ewes to join rams were used.

2.3. Sensitivity of the Herd Owner to Animal Health and Welfare

In assessing the sensitivity of herd owners about animal welfare and health, whether there is a vaccination schedule, the precautions they take to protect animal health, their sensitivity in litter management and shelter construction was evaluated using χ^2 square test.

2.4. Statistical Analysis

In the study, the evaluations of the effects on animal production depending on factors such as the education level of the herd owner, age, work experience, activities other than animal husbandry, and family support were made with the SPSS package program (Ver.21) one-way analysis of variance. Four of the farmers participating in the survey were women and gender was excluded from being considered a factor since it could not be

determined to affect the characteristics emphasized. While evaluating the effects of factors such as the education level of the breeders, their occupations other than animal husbandry, and family assistance on animal production, GLM was used, and the mentioned factors were taken as constant. The age and work experience of the farm owners were taken as covariates. Values were given as mean \pm SEM (standard error of mean). Differences between means, expressed as percentages, were performed by χ^2 square analysis.

3. Results

The sheep holdings in Ordu in terms of animal assets and the animal assets of the enterprises participating in the survey are shown in Table 1 and Table 2, respectively. It has been determined that the number of sheep per farm in Ordu province varies between 1 and 3242 heads, and the rate of farms with less than 100 sheep is 59.27%. Among the farms with less than 100 animals, 7.2% have five or fewer animals. The relations between the business owners' qualifications and the farm's production planning (number of the ewe joined to ram, the number of lambs produced), health protection practices, and activities other than animal husbandry are given in Table 3-5.

The information given by the breeders participating in the survey about both their businesses and their characteristics was evaluated. It was determined that 45 farm owners who participated in the survey were primary school graduates, 11 secondary school graduates, 17 high school graduates, and three undergraduate graduates. The education level of the farm owners did not make a statistical difference in the number of animals on the farms. The average age of the business owners participating in the survey is 48.6 (min 22, max 75), and their work experience is 30.8 (min 2, max 40) years.

3.1. The Relationship between the Education Level of the Owner of the Business, Production and Animal Welfare

The management style that the education level of the herd owner will reveal in processing management may show differences from other businesses with animal welfare, health, profitability, work discipline, and order. These differences are seen in practices such as the preparation and implementation of vaccination programs, which indicate the importance given to animal welfare and health, the planning of shelters, birthing compartments, quarantine compartments, ventilation systems, and litter management.

The educational status of the enterprises participating in the research, the total number of animals owned by the enterprises, and the number of lambs obtained per ram sheep are shown in the Table 3. It has been determined that women's active business responsibility ratio in sheep enterprises is around 3.95%, and their support is about 80.26% in male-run businesses. According to the

education level of business owners, the support rate of spouses to each other is 82.22% for primary school graduates, 81.82% for secondary school graduates, 70.59% for high school graduates, and 100.00% for university graduates. It was determined that family support was ineffective in herd size and management. It was determined that 81.6% of the breeders made and implemented the necessary vaccination programs and made the arrangements needed in the shelters for the welfare and health of the animals. When the education level, experience, gender, additional work status of the

breeders, and the importance they give to herd health (vaccination) and animal welfare (additional service departments such as animal shelter, lamb, sick animals, maternity departments) are examined, it has been determined that there is no difference in terms of the mentioned factors. This study determined that 24.32% of the enterprises participating in the research were engaged in animal husbandry, 58.11% in sheep breeding and hazelnut production, and 17.37% in animal husbandry hazelnut production and other commercial activities.

Table 1. Distribution of sheep farms and the number of sheep in farms by districts throughout Ordu province (Anonim, 2022).

County	n	Number of farms		Total numbers of Sheep on farm	Number of animals per farm (Min- Max)	
		Less than 5	& 100		Mean	
Akkuş	93	1	55	9.626	4-417	104
Altınordu	261	3	161	27.882	3-3242	107
Aybastı	206	4	109	26.691	1-1297	130
Çamaş	11	0	8	789	10-186	72
Çatalpınar	17	1	7	1.652	2-191	97
Çaybaşı	20	0	14	2.163	10-374	108
Fatsa	147	15	88	13.961	1-642	95
Gölköy	111	1	63	11.221	3-493	101
Gülyalı	32	1	18	4.297	1-769	134
Gürgentepe	56	5	43	2.977	1-219	53
İkizce	25	0	12	3.251	11-365	130
Kabadüz	57	2	35	5.394	1-598	95
Kabataş	93	4	51	9.945	1-424	107
Korgan	72	3	50	5.081	1-219	71
Kumru	160	8	102	14.514	1-662	91
Mesudiye	111	2	57	14.822	1-861	134
Perşembe	131	15	85	9.096	1-406	69
Ulubey	127	7	69	13.855	1-594	109
Ünye	153	8	89	13.996	1-433	92
Total	1883	80	1116	191.213	7-1500	103.62

Table 2. The surveyed districts, businesses, the number of sheep and the ratio of the surveyed businesses to the total (Anonim, 2022)

County	n	Sheep (Min-Max)	Number of ewe	Ram	FN/TF
Altınordu	21	110-1500	5228	194	27.63
Aybastı	18	120-1000	4388	162	23.68
Gölköy	4	135-400	905	30	5.26
Mesudiye	7	110-400	2020	76	9.21
Fatsa	8	105-200	1200	56	10.53
İkizce	1	120	120	6	1.32
Kabataş	3	130-132	392	15	3.94
Gürgentepe	1	150	150	5	1.32
Ulubey	6	130-250	988	36	7.89
Kabadüz	2	175-200	375	15	2.63
Gülyalı	1	170	170	7	1.32
Kumru	2	155-180	335	12	2.63
Perşembe	1	220	220	9	1.32
Ünye	1	250	200	10	1.32
Total	76	100-1500	16.691	633	100.00

FN= farm number, TF= total farm

Table 3. The effect of the education level and workload of the farm owner on the size of the herd and lamb yield per ewe.

Education Level	Business	Herd Size	Number of lambs per ewe
Primary (45)	Overall (45)	208.9±20.83	0.95±0.026
	SF (14)	234.8±60.46	0.97±0.039
	SF+H (26)	199.2±14.54	0.95±0.034
	SF+HP+OA (5)	183.0±45.27	0.85±0.117
Secondary (11)	Overall (11)	175.7±15.91	0.94±0.058
	SF (1)	105.0	0.70±0.000
	SF+HP (8)	173.5±10.42	0.98±0.072
	SF+HP+OA (2)	220.0±8.00	0.91±0.044
High School (17)	Overall (17)	275.2±80.24	0.97±0.026
	SF (4)	190.0±41.03	1.03±0.037
	SF+HP (9)	163.3±17.04	0.94±0.026
	SF+HP+OA (4)	612.0±304.80	0.97±0.091
University (3)	Overall (3)	267.7±72.56	0.88±0.191
	SF (1)	123.0± 0.000	1.08±0.000
	SF+HP+OA (2)	340.0±10.00	0.78±0.283

SF= sheep farm, HP= hazelnut production, OA= other activities

Table 4. The relationship between the working status of herd owners in different business branches and their educational status

Business type	Education level (n-%)				Overall*
	Primary	Secondary	High	University	
SF	14 (31.1)	1 (9.1)	4 (23.5)	1 (33.3)	20 (26.3)
SF - HP	26 (57.8)	8 (72.7)	9 (52.9)	0	53 (56.6)
SF - HP - OA	5 (11.1)	2 (18.2)	4 (23.5)	2 (66.7)	3 (17.1)
Overall	45 (100)	11 (100)	17 (100)	3 (100)	76 (100)

SF= sheep farm, HP= hazelnut production, OA= other activities

*The status of herd owners to do different jobs is independent of their education level ($\chi^2=9.666$ P=0.139).

Table 5. Herd management and productivity status according to the work distribution of herd owners

Business type	Average Herd Size	Number of ewes Joined to ram	Lambs yield	Number per 100 ewes joined to ram
SF (18)	221.2±47.92	164.8±28.22	152.2±18.39	92.7±3.55
SF + HP (43)	186.5±9.85	144.1±6.77	137.4±6.68	95.1±2.34
SF + HP + OA (13)	335.5±102.62	229.9±59,59	199.7±42.11	87.0±4.44

SF= sheep farm, HP= hazelnut production, OA= other activities

4. Discussion

Sheep breeding is an essential source of meeting the red meat needs in Turkey. It is necessary to determine the current situation of this meat production source in each region where it is grown and make plans from the obtained data for the ideal use of existing resources. In the vast majority (59.27%) of the sheep and goat farms in Ordu, the number of animals is less than 100 heads (Table 1). This situation poses a risk regarding the sustainability of enterprises, continuity, and production stability. Improving and maintaining the existing structure in terms of business and animal assets will be beneficial in terms of preventing the dominance of large enterprises in animal production and maintaining production and price stability. The main factors affecting the enterprise's profitability in animal production can be listed as the number of animals, the amount of product

obtained from the unit animal, the input costs, and the sales value of the product. There are two options for increasing production and profit: increasing the number of animals or increasing the yield per unit animal. Increasing the number of animals in rural conditions will be a result-oriented approach in a short time (Düzgüneş et al., 2012).

Production in sheep breeding in Ordu is based on pasture. The number of animals in the surveyed farms varies between 110 and 1500 heads, and the owners' education, experience, age, and different work status do not make any difference in herd management and productivity (Table 2). Traditional production methods continue regardless of the herd owners' education (Table 3), gender, experience, age, and additional work (Table 5). Equipping the traditions with information about herd management and influential factors in productivity

increase will contribute to the farm's sustainability and the herd owner's welfare.

Among sheep breeders, the rate of working in other jobs is high (73.7%, Table 4). This situation makes it difficult to develop sustainable and effective policies in sheep breeding because a slight risk in the sector strengthens the possibility of turning to other businesses.

The health and welfare of animals raised in animal production are becoming increasingly important. Animals' exposure to adverse effects of the environment outside the comfort zone causes negative effects such as low productivity and diseases (Marcone et al., 2022). In providing ideal conditions for animals, sometimes negligence may occur due to lack of awareness or knowledge and sometimes due to economic inadequacies. Considering that sheep breeders are more intertwined with nature and more connected to nature than other livestock sectors, and their economic opportunities are more limited, it is understood that they produce under challenging conditions. Although it is strange to prioritize the animal's welfare that the producer raises without taking into account her own welfare, it is seen that herd owners of all education levels try to provide the best conditions for their animals in this study.

It has been determined that the relationship between the education level of the farm owner, his approach to innovations, animal welfare and production level is not at the expected level. There is no difference in herd management between breeders with low and high education levels has been evaluated as an indicator of not getting rid of traditions and not being open to innovations.

Turkey's sheep population can be easily doubled, primarily by solving the problems enterprises face with less than 100 heads in production, encouraging them to raise more animals and train the breeders. Considering the age of business owners, the number of sheep in the business, the number of the companies that are content with only animal husbandry, the number of people sharing the income of the business, family support, business planning, it is predicted that the employment rate in rural areas will decrease in the future and this sector will go further back.

5. Conclusion

The results presented in this study are based on the comments obtained from examining the official records of sheep holdings and the statistical evaluation of the information provided by the breeders participating in the survey. The results of present study indicated that sheep breeders in Ordu province mostly carry out hazelnut production and animal production together, some breeders participate in production with a small number of animals in a way that can be considered as a hobby because they cannot break with their traditions. It has been determined that there are very few female herd owners among the breeders, the average age of the herd

owners is around 49, and the younger generations are not very enthusiastic about sheep breeding. As a result, it is thought that maintaining the current production level by improving it, or at least maintaining it as such, will be beneficial for both the rural population and the country's economy. It has been determined that the relationship between the education level of the farm owner, his approach to innovations, animal welfare and production level is not at the expected level. Turkey's sheep population could easily be doubled, primarily by solving the problems faced by farms with fewer than 100 animals in production and by encouraging breeders to raise more animals. Plans should be developed to improve social and cultural conditions that will make life in rural areas attractive, maintain employment, and increase contributions to the family and national economy. It is hoped that these improvements will effectively increase productivity in farm production, ensure sustainability, and gain the attraction of younger generations

Author Contributions

A.A. (100%) taken data, structured the paper and wrote the manuscript. M.A.Ç. (100%); initiated the research idea, suggested the research methods, supervised the research, analyzed, interpreted the data, and edited the manuscript. All authors reviewed and approved final version of the manuscript.

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Ethical Consideration

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. The experimental procedures were approved by the Local Social and Human Sciences Research Ethics Committee of Ondokuz Mayıs University (Approve number: 2022/169).

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