DOI: 10.46876/ja.144491

JOURNAL OF AGRICULTURE

RESEARCH ARTICLE

ISSN: 2636-8757

# Study to Determine the Level of Animal Welfare in Sheep Farms in the Central District of Iğdır Province

**Mesut ULUSOY**[1] | **Gökhan KOÇAK**[2*] | **İsa YILMAZ**[3]

[1] Iğdır University, Institute of Graduate Education, Department of Animal Science, 76000, Iğdır, Türkiye.

[2] Iğdır University, Tuzluca Vocational School, Laboratory and Veterinary Health Program, 76410, Iğdır, Türkiye.

[3] Muş Alparslan University, Faculty of Applied Sciences, Department of Animal Production and Technologies, 49160, Muş, Türkiye.

**Correspondence**
Gökhan KOÇAK, Iğdır University, Tuzluca Vocational School, Laboratory and Veterinary Health Program, 76410, Iğdır, Türkiye. Phone number: 0544 344 6260, Email: kocakgokhan60@gmail.com

**Abstract:** This study was conducted to determine and evaluate the level of animal welfare in sheep farming enterprises in the central district of Iğdir province. In the study, the data obtained through the face-to-face survey method from 100 enterprises was evaluated. In the assessment, it was determined that in terms of animal welfare, the resting, lighting, ventilation, feeding and watering areas were sufficient at a rate of 72%, 76%, 83%, 72% and 75% respectively. It was reported that 97% of enterprises had lamb compartments, of which 67% were sufficient. Ram compartments were present in 73% of enterprises, and 60% of them were sufficient. Sick animal compartments existed in 72% of enterprises, and 47% of them were sufficient. Lambing compartments were found in 76% of enterprises, and 54% of them were sufficient. When the animal welfare related parts of the enterprises were examined, it was determined that shearing sheds, footbaths, sheep baths, vehicle baths, loading ramps, and manager/caretaker houses were not present in 73%, 92%, 92%, 92%, 51%, and 71% of enterprises, respectively. It was found that 63% of enterprises did not have lambing pens, and 70% did not perform cord cleaning. It was determined that 90% of enterprises had lame animals, and 79% had been attacked by foreign animals. As a result, in order to ensure the permanence of animal welfare, it will create an awareness in producers that institutions and organizations require animal shelters to comply with animal welfare while building, renovating, or providing livestock support.

**Keywords:** Sheep, Sheep welfare, Enterprise, Competence, Iğdir province

## INTRODUCTION

For the population living in rural areas, livestock farming is not only a sustainable source of income, but also a suitable instrument for socio-economic growth (Hamadani et al., 2023). Regardless of climatic conditions, part of the livelihood of low-income families living in rural areas around the world is provided by small animal husbandry (Kaygısız et al., 2023a). Animal husbandry, which has become important along with sedentary life, has also increased the interest in the behavior of animals (Savaş and Yurtman, 2008).

The sustainable source of income for people in arid and semi-arid regions of the world has long been small-scale livestock farming. Even in times of famine, these people have managed to obtain nutrient-rich products such as milk and meat from low-quality fodder with the help of small livestock (Kaygısız et al., 2023a). However, the sustainability of animal productivity can be achieved by protecting the environment, breeding adapted to the life physiology and behavior of animals and ensuring their welfare (Yılmaz and Çam, 2023)

Due to this, many international discussions about the welfare of animals raised for their products have come to the agenda (Bracke, 2009). In many studies, it has been reported that animal products obtained as a result of compliance with animal welfare are more preferred by consumers (Ortega et al., 2016). The World Organization for Animal Health (WOAH) has reported that animal welfare is a

Received: 29-02-2024 | Accepted: 15-07-2024

complex and multifaceted issue with scientific, ethical, cultural, economic, religious, social, and political dimensions and is receiving an increasing demand from civil societies (WOAH, 2022).

In the literature, it has been emphasized that animal welfare will have a positive impact not only on growth and health, but also on the quality of products obtained from animals (Phillips et al., 2010; Bitzios et al., 2011). Thus, while ensuring animal welfare contributes to improving the quality of animal products, it also helps to meet the ethical and moral requirements of the public. Since the environments in which animals live can affect and change their physiological and behavioral habits, ensuring animal welfare will also help reduce the stress that may occur in animals. In addition, in this way, the use of pesticides, feed additives, and medicines that pose serious health threats to consumers will also decrease (Liang et al, 2022). When determining the level of welfare in farm animals, it is necessary to identify the differences in animal behavior and control these differences (Andreasen et al., 2013).

In view of global warming and climate change, it is assumed that small ruminants will play an important role in livestock farming in arid and semi-arid regions and will be increasingly needed in the coming years (Ben Salem and Smith, 2008). Initially, the concept of animal welfare was evaluated on the basis of the presence or absence of stress in animals (Çevikkol et al., 2023). Maximum efficiency in animal production depends on the temperature and humidity values of the target animal species being within the comfort zone, i.e. that the animals' well-being is guaranteed. Unsuitable environmental and housing conditions (high temperature and humidity, etc.) cause stress in the animals and lead to behavioral, physiological and metabolic changes (Sucu et al., 2015).

In other words, the concept of animal welfare also includes the expression that animals are comfortable in the environment in which they live, and the definition of animal welfare is also based on the behavior patterns, emotions, and biological functions of animals (Ünal, 2010). That is, animal welfare includes the fact that animals are healthy in addition to being physically and mentally well (Koyuncu and Öziş Altınçekiç, 2010).

One of the important indicators of whether an animal is in “well-being” is that the animal can demonstrate all behaviors freely due to its nature and structure (species-specific characteristics) (Savaş et al., 2010). For this purpose, it is necessary to take the necessary environmental protection measures, and it should be based on the raising experiences in accordance with the physiology and behavior of animals; thus, by creating an appropriate environment for animal welfare, the sustainability of their yields can be ensured (Yılmaz and Çam, 2023).

The purpose of this study was to examine the appropriateness of the environments used in sheep farming for animal welfare in Igdir province. In addition, it was aimed to make recommendations to eliminate the deficiencies identified in terms of animal welfare and to improve the quality of life of animals.

## MATERIALS and METHODS

Some geographical and climatic characteristics of the region where the research was carried out: The province of Iğdır is located in the Eastern Anatolia Region of Turkey and in the easternmost part of Turkey. Iğdır province borders; Erzurum, Kars, Azerbaijan (Nakhichevan), Iran and Armenia. The air temperature in the city drops to -30 °C in winter. In summer, the air temperature can reach 42 °C. Very little precipitation falls in the province of Iğdır. As a result, the climate here is semi-arid and the vegetation is steppe-like. Iğdır province is one of the least forested regions in Turkey. In terms of land distribution, 41 is meadows and pastures, 33% is agricultural land, 26% is unused land and 1% is forest land. The latitude and longitude are 44 E 02 and 39 N 55 respectively

The data obtained from the survey was prepared for analysis using an Excel spreadsheet program. The results for characteristics that can be summarized by counting in two-dimensional tables were expressed as numbers and percentages. The IBM SPSS Statistics 20.0 program was used to analyze the data (SPSS, 2011).

Within the scope of the research, a face-to-face survey study was conducted with owners of 100 enterprises located in Igdir province and engaged in sheep farming activities. To be able to determine the sample size, the Simple Random Sampling Method reported by Yamane (2010) was used. The method in question is given in Equation 1.

$$n = \frac{Nxt^2x\ p\ x\ q}{(N-1)\ x\ D^2+t^2x\ p\ x\ q} \quad (1)$$

Where n is sample size, N is Number of enterprises, D is accepted or desired sampling error, t is table value, p is rate to be calculated, and q is 1-p. Based on this equation, sample size was calculated as follows:

$$n = \frac{2029\ x\ 1.962\ x\ 0.5\ x\ 0.5}{(2029-1)\ x\ 0.12+1.962\ x\ 0.5\ x\ 0.5} = 92 \quad (2)$$

The sample size was determined as 92. To minimize sampling errors, more than 10% of this size was included in the study and the study was carried out with a sample size including 100 enterprises.

## RESULTS and DISCUSSION

Descriptive statistics for the demographic characteristics of the sheep farmers participating in the study and their assets are given in Table 1.

In this study, it was determined that the vast majority of the sheep farmers are primary school graduates (Table 1). In the previous studies conducted on this subject, it was also found that a high proportion of farmers were at the level of primary school education (90.3%, 64.7%, and 63.1%, respectfully) (Bilginturan and Ayhan, 2009; Karadaş, 2018; Özyürek et al., 2018).

When the main professions of the sheep farmers were examined, it was observed that the highest proportion (57%) were farmers, 40% were freelancers, and 3% were retired (Table 1). In the literature, Kandemir et al (2015) reported that the majority of the sheep breeders (90.9%) were farmers. However, in this study, the participants reported the farming profession at a low rate. This is a negative situation.

The vast majority of sheep farmers (69%) stated that this profession is their main source of livelihood (Table 1). In the literature, the proportion of breeders who accept sheep farming as their main source of livelihood and additional income is respectively 60% and 20% (Şahinli, 2014) and 82.4% and 17.6% (Kandemir et al., 2015). Şahin and Olfaz (2019) reported that sheep farmers did this profession due to domestic needs (44.6%), necessity (38.3%), and as the main source of livelihood (11.7%).

It was determined that in the enterprises, the time spent in sheep farming was generally 21 years and over (54%) (Table 1). These results show that the experience of breeders is good. Öziş Altınçekiç (2014) stated that the experience of sheep farmers was more than 10 years. In the current study, it was found that 74.0% of the herds were left to the sheep farmers by their families, while 26.0% bought their herds (Table 1). This should be taken into consideration as ¼ of the breeders have returned to sheep farming.

When the herd size of the enterprises was examined, the proportion of enterprises with a herd size of more than 100 heads was determined to be 68.0% (Table 1). In some studies, it has been reported that the herd size varies based on regions (Elmaz et al., 2014; Tüfekçi and Olfaz, 2015).

***Table 1.*** *Descriptive statistics for the demographic characteristics of the sheep farmers and their assets*

| Characteristics | Sub-Groups | n | % | Characteristics | Sub-Groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **100** | **100.0** | | | **100** | **100.0** |
| Education Level | Literate-no diploma | 17 | 17.0 | The size of the sheep herd (head) | >50 or less | 9 | 9.0 |
| | Primary school | 42 | 42.0 | | 51-100 | 23 | 23.0 |
| | Secondary school | 18 | 18.0 | | 101-200 | 19 | 19.0 |
| | High school | 9 | 9.0 | | 201-300 | 17 | 17.0 |
| | University | 14 | 14.0 | | 301-400 | 12 | 12.0 |
| Age (year) | 21-40 | 37 | 37.0 | | >401 and more | 20 | 20.0 |
| | 41-60 | 42 | 42.0 | The land asset of the enterprise (decares) | Yok | 23 | 23.0 |
| | >61 | 21 | 21.0 | | 1-50 | 42 | 42.0 |
| Main Profession | Farmer | 57 | 57.0 | | 51-100 | 25 | 25.0 |
| | Freelancer | 40 | 40.0 | | > 101 | 10 | 10.0 |
| | Retired | 3 | 3.0 | Sheepfold (shelter) type | Uncovered | 18 | 18.0 |
| The reason for raising animals | The main source of livelihood | 69 | 69.0 | | Covered | 82 | 82.0 |
| | Additional income source | 31 | 31.0 | Pasture source | Belongs to enterprise | 34 | 34.0 |
| Time spent in Sheep Farming (year) | 1-10 | 19 | 19.0 | | Common use | 66 | 66.0 |
| | 11-20 | 27 | 27.0 | Time for benefiting from pasture (month) | <4 | 41 | 41.0 |
| | 21-30 | 30 | 30.0 | | 5-8 | 53 | 53.0 |
| | > 31 and more | 24 | 24.0 | | 9-12 | 6 | 6.0 |
| The way to have a herd | Passing through the family | 74 | 74.0 | Daily pasturing time (hours) | < 8 | 22 | 22.0 |
| | Buying | 26 | 26.0 | | 8-12 | 36 | 36.0 |
| Sheep grazing place | Private pasture | 30 | 30.0 | | > 12 | 42 | 42.0 |
| | Village pasture | 23 | 23.0 | Addition feeding after returning from pasture | Yes | 47 | 47.0 |
| | Plateau | 47 | 47.0 | | No | 53 | 53.0 |
| Lamb grazing with the dam (mother) | Yes | 60 | 60.0 | Pasturing in winter | Yes | 11 | 11.0 |
| | No | 40 | 40.0 | | No | 89 | 89.0 |

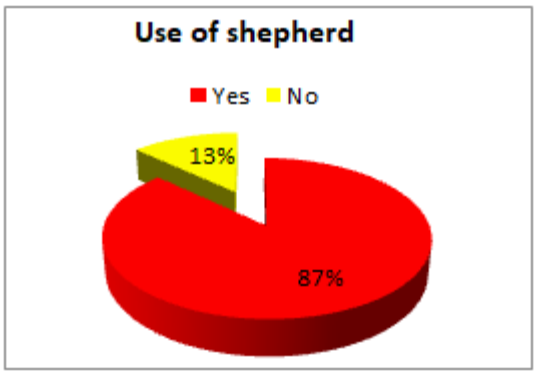
In terms of sheepfold (shelter) type, it was determined that the proportion of enterprises with an uncovered shelter was 18%, and the proportion of enterprises with a covered shelter was 82% (Table 1). Serttaş et al., (2022) reported that 8.6% of the enterprises had uncovered shelter types, 45.7% had semi-covered shelters, and 45.7% had covered shelters. Şahinli (2014) found that the rate of the uncovered shelter type was 88% and the covered shelter type was 12%. Keskin and Bebek (2018) stated that 72% of sheep farmers were engaged in animal husbandry and mostly had semi-covered shelters.

In the present study, it was found that the pasture resources of 66% of the enterprises were common areas, while 34% of them used their own properties (Table 1). Keskin and Bebek (2018) stated that 19% of sheep farming enterprises used common areas as pasture, while 8% used their own private properties. Arıtunca and Karabacak (2020) reported that 9.6% of enterprises used vacant lands and stubble fields as pasture resources, 14.5% used village pasture + public lands, 26.5% used public pasture, and 49.4% used village pasture. Kandemir et al., (2015) found that 2.9% of enterprises used their own properties as pasture resources and 97.1% used village common lands.

The highest time for benefiting from pasture for sheep grazing in enterprises (59%) was determined to be 5 months and above (Table 1). It was found that the daily pasturing time of animals was more than 12 hours in 42% of enterprises, 8-12 hours in 36%, and less than 8 hours in 22% (Table 1). Kandemir et al. (2015) reported that 21% of enterprises used pastures for more than 12 hours, 73.8% for 8-12 hours, and 5.2% for less than 8 hours.

It was seen that 53% of the enterprises gave additional feeds to sheep after returning from the pasture. Ceyhan et al. (2015) reported the rate of feeding after pasturing was 85.4%. Özyürek et al. (2018) reported the additional feeding rate in enterprises as 12%.

In this study, enterprises' shepherd utilization rate was found to be 87% (Figure 1). Keskin and Bebek (2018) reported this rate as 14%, and Şahinli (2014) reported it as 58%. Öziş Altınçekiç (2014) reported this rate as 100%, 93.75%, and 86.21% in large, medium, and small-sized enterprises, respectively.



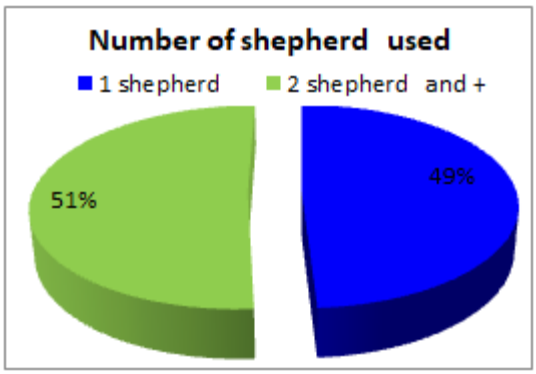




***Figure 1.*** *The use of shepher* ***Figure 2.*** *The number of shepherd used*

It was observed that 49.4% of the enterprises used 1 shepherd, while 51% used 2 or more shepherd (Figure 2). Bilginturan and Ayhan (2009) reported the number of shepherd used as 4, 3, 2, and 1 person in 0.5%, 1.5%, 12.4%, and 85.6% of enterprises, respectively.

Figure 3 shows the descriptive statistics for basic animal welfare qualifications in the enterprises and the assets they have.

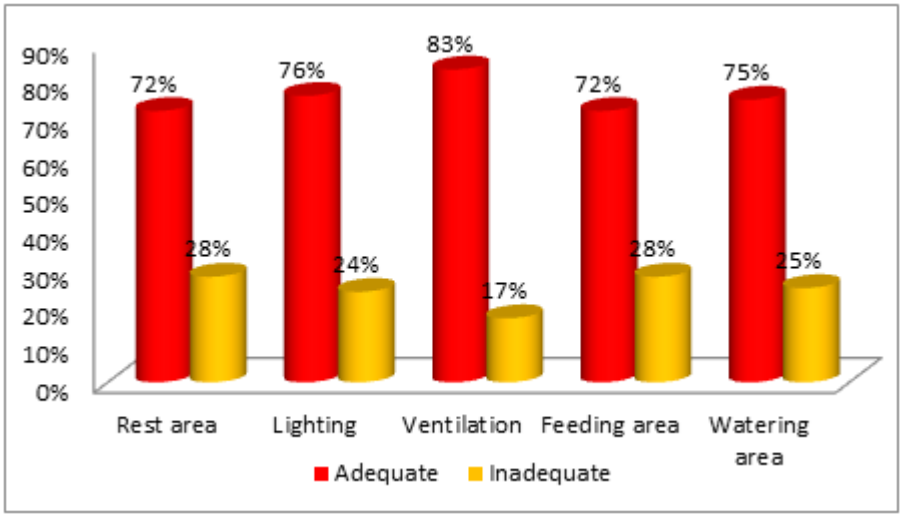



***Figure 3.*** *Statistics on the basic competencies of animal welfare in the enterprises*

As shown in the figure, it was found that the resting areas, lighting, and ventilation in the enterprises were sufficient at the rates of 72.0%, 76.0%, and 83.0%. Ceyhan et al. (2015) stated that in sheep shelters, resting areas were sufficient at a rate of 65.7%, and ventilation was sufficient at a rate of 95.8%. Kaygısız et al. (2023a) reported that 37% of the farms have ventilation chimneys in shelters. In addition, it was determined that in their enterprises, feeding areas and the watering areas were sufficient at the rates of 72% and 75%, respectively. Kandemir et al. (2015) reported that 92.9% of enterprises have feeders, and 91.5% have water troughs.

In this study conducted in Igdir province, in relation to animal welfare, sheep farmers who agreed to answer survey questions were also asked about the add-on compartments (such as shearing sheds, footbaths, and sheep baths) owned by their shelters in their enterprises, and the answers received are given in Table 2

***Table 2.*** *Statistics of the add-on compartments in enterprises*

| Compartments | Sub-groups | n | % | Compartments | Sub-groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **100** | **100.0** | | | **100** | **100.0** |
| Lamb compartment | Yes | 97 | 97.0 | Shearing sheds | Yes | 27 | 27.0 |
| | No | 3 | 3.0 | | No | 73 | 73.0 |
| Ram compartment | Yes | 73 | 73.0 | Footbaths | Yes | 8 | 8.0 |
| | No | 27 | 27.0 | | No | 92 | 92.0 |
| Sick animal compartment | Yes | 72 | 72.0 | Sheep baths | Yes | 8 | 8.0 |
| | No | 28 | 28.0 | | No | 92 | 92.0 |
| Lambing compartment | Yes | 76 | 76.0 | Vehicle baths | Yes | 8 | 8.0 |
| | No | 24 | 24.0 | | No | 92 | 92.0 |
| Milking compartment | Yes | 79 | 79.0 | Loading ramps | Yes | 49 | 49.0 |
| | No | 21 | 21.0 | | No | 51 | 51.0 |

As can be seen in Table 2, in terms of the relationship between the animal welfare competencies of enterprises and the additional compartments in shelters, it was found that lamb, milking, lambing, sick animal, and ram compartments were sufficient at rates of %97, %79, %76, %72, and 73%, respectively. Kandemir et al. (2015) found that lamb, sick animal, lambing, shearing, and ram compartments in enterprises were sufficient at a rate of 18.4%, 5%, 4.3%, 73%, and 6.4%. Şahin and Olfaz (2019), on the other hand, stated that lamb compartments were found in shelters at a rate of 75.5%. In some studies conducted on this subject, it was reported that the presence of lambing compartments in shelters was 69.1% (Sahin and Olfaz, 2019). Öziş Altınçekiç (2014) reported that this rate was 51.72%, 86.96%, and 61.54% in small, medium and large-sized enterprises, respectively. Kaygısız et al. (2023b) reported the presence of a milking compartment in Mersin province as 6.7%. In their study, Kandemir et al. (2015) determined that there were no shearing sheds in enterprises. Kaygısız et al. (2023a) reported that no special shearing place in the farms.

The rate of having footbaths in the enterprises was determined as 92% (Table 2). In the literature, Kaygısız et al. (2023b) found that there were 1.7% of footbaths in enterprises Mersin province, while Öziş Altınçekiç (2014) and Kandemir et al. (2015) reported that there were footbaths in enterprises at a rate of 5.9% and 0.7%, respectively.

In this study, it was determined that the enterprises had sheep baths, vehicle bath, loading ramp, and a manager/caretaker room at a rate of 8%, 8%, 49%, and 29%, respectively (Table 2). Kaygısız et al. (2023b) reported that there were sheep baths in enterprises at a rate of 1.7%, and Ceyhun et al. (2015) reported it at a rate of 2.1%. Kandemir et al. (2015) determined that there were vehicle baths in enterprises at a rate of 0.7%, loading ramps at a rate of 1.4%, and caretaker rooms at a rate of 61%.

Some issues related to herd management and lambing management, which are important for animal welfare, were also asked to the sheep farmers within the scope of the survey. Descriptive statistics about the obtained answers obtained given in Table 3.

***Table 3.*** *Descriptive statistics for herd management and some applications in enterprises*

| Applications | Sub-groups | n | % | Applications | Sub-groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **100** | **100.0** | | | **100** | **100.0** |
| Preparation for lambing | Yes | 40 | 40.0 | Frequency of fertilizer cleaning | Daily | 13 | 13.0 |
| | No | 60 | 60.0 | | Weekly | 31 | 31.0 |
| Lambing pen usage | Yes | 37 | 37.0 | | Monthly | 56 | 56.0 |
| | No | 63 | 63.0 | Fertilizer usage | Use within the enterprise | 95 | 95.0 |
| Umbilical cord care | Yes | 30 | 30.0 | | Marketing | 5 | 5.0 |
| | No | 70 | 70.0 | Fertilizer collection method | Shovel/Wheelbarrow | 89 | 89.0 |
| Method of the destruction of lamb membranes | Burying in the ground | 21 | 21.0 | | Tractor scraper | 11 | 11.0 |
| | Giving to the dog | 74 | 74.0 | The method of feeding lambs without a dam | cross-fostering | 62 | 62.0 |
| | Throwing it in the trash | 5 | 5.0 | | Bottle feeding | 38 | 38.0 |
| Feeding with colostrum | Yes | 88 | 88.0 | Fertilizer storage | In the fertilizer store | 17 | 17.0 |
| | No | 12 | 12.0 | | Outside the enterprise | 61 | 61.0 |
| | | | | | Inside the enterprise | 22 | 22.0 |

As shown in Table 3, it was determined that lambing preparation was performed in 40% of the enterprises, umbilical cord care was performed in 30% of the enterprises, and lambing pens were used in 37% of the enterprises. In similar studies, the rate of umbilical cord care in enterprises was found to be 80% by Keskin and Bebek (2018), while Özyürek et al. (2018) found this rate as 25% and Kandemir et al. (2015) found it as 16.7%. Öziş Altınçekiç (2014), on the other hand, reported that this rate was 27.59%, 62.50%, and 47.37% in small, medium, and large-sized enterprises, respectively. On the other hand, it was reported by Kandemir et al. (2015) that lambing preparation was carried out at a rate of 25.8% in sheep farming enterprises.

In this study, regarding the destruction of lamb membranes, sheep farmers stated that they mostly gave these membranes to dogs (74%) (Table 3). Kandemir et al. (2015) reported that 10% of enterprises bury lamb membranes, 39.5% threw them to the environment, and 50.4% gave them to dogs. Öziş Altınçekiç (2014) reported that 10.53% of large-scale enterprises threw lamb membranes in the trash, 18.42% were not interested, 26.31% buried them, and 44.74% gave them to the dog.

In addition, the sheep farmers were asked how they feed the motherless lambs. 62% of the enterprises stated that they applied the cross-fostering method, and 88% expressed that they fed lambs with colostrum. Related to this issue, Kandemir et al. (2015) reported that 94.1% of enterprises used the cross-fostering method.

In the current study, it was determined that fertilizer cleaning frequencies in enterprises were monthly at a rate of 56%, weekly at a rate of 31%, and daily at a rate of 13%. Kandemir et al. (2015) reported that fertilizer cleaning was done monthly at a rate of 43.2%, weekly at a rate of 54% and daily at a rate of 2.2%.

Regarding fertilizer management, it was determined that a large part of enterprises (95%) used these fertilizers themselves, the fertilizer collection was performed by wheelbarrow at a rate of 89%, and a high proportion (61%) of fertilizers were stored outside the enterprise (Table 3). Arıtunca and Karabacak (2020) reported that the vast majority of animal breeders (95.2%) used animal fertilizers in

their fields. Serttaş et al. (2022) reported that the majority of enterprises (84.8%) gave fertilizers to the fields.

Within the scope of this study, survey questions about the undesirable situations that were closely related to welfare of sheep farmers' animals were also asked, and the answers obtained are summarized in Table 4.

***Table 4.*** *Statistics on herd protection, disease control, and anomalies in the enterprises*

| Examined Items | Sub-groups | n | % | Examined Items | Sub-groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **100** | **100.0** | | | **100** | **100.0** |
| Lame animal presence | Yes | 90 | 90.0 | Fighting parasite | Yes | 96 | 96.0 |
| | No | 10 | 10.0 | | No | 4 | 4.0.0 |
| Udder abnormality | Yes | 84 | 84.0 | Parasite control method | Pill | 33 | 33.0 |
| | No | 16 | 16.0 | | Injection | 42 | 42.0 |
| The form of udder abnormality | Too many nipples | 22 | 22.0 | | Other | 25 | 25.0 |
| | Asymmetry | 20 | 20.0 | Regular nail care | Yes | 50 | 50.0 |
| | Blind/Saggy udder | 58 | 58.0 | | No | 50 | 50.0 |
| Foreign animal attack | Yes | 79 | 79.0 | Lamb death in lactating process | Yes | 75 | 75.0 |
| | No | 21 | 21.0 | | No | 25 | 25.0 |
| Regularity of official vaccinations | Regularly | 84 | 84.0 | Causes of lamb death | Hunger | 3 | 3.0 |
| | Not regular | 16 | 16.0 | | Not being able to find the dam | 6 | 6.0 |
| Regularity of special vaccinations | Regularly | 90 | 90.0 | | Diarrhea | 60 | 60.0 |
| | Not regular | 10 | 10.0 | | Disease | 31 | 31.0 |

When the descriptive statistics related to some anomalies in herds were examined, it was observed that the rates of lame animal, udder abnormality, blind/saggy udder, and foreign animal attack in the enterprises were 90.0%, 84.0%, 58.0%, and 79.0%, respectively. Kandemir et al. (2015) reported the lameness problem at a rate of 56.7% in sheep farming enterprises. Şahin and Olfaz (2019) reported that the rate of foreign animal attacks on sheep was 9.6%. When descriptive statistics of herd protection and disease control in enterprises were examined, it was found that parasite control was performed at a rate of 96.0% (Table 4). Kaygısız et al. (2023b) reported external parasite control in sheep farming enterprises at a rate of 100.0%, while Özyürek et al. (2018) reported internal and external parasite control at a rate of 93%. Kaygısız et al. (2023a) reported that it was carried out in 99% of the businesses of parasite control in Sinop province.

In addition, it was found that parasite control was made by injection in 42% of enterprises, by pill in 33%, and by other applications in 25% (Table 4). Öziş Altınçekiç (2014) reported that regular internal parasite control was carried out with medication in 97.1% of enterprises, and external parasite control was carried out as a body bath in 84.7% of enterprises. Kandemir et al. (2015) reported that internal parasite control was performed by pill in 80.8% of the enterprises and by injection in 19.2% of them, while external parasite control was performed by pill in 40.9% of the enterprises, by injection in 28.5% of them, and by other applications in 30.6% of them.

The survey results revealed that official vaccinations were performed regularly at a rate of 84% and private vaccinations were performed regularly at a rate of 90% (Table 4). Kaygısız et al. (2023a) reported that 99.0% of the farms in Sinop province applied preventive vaccines for disease control. Bilginturan and Ayhan (2009) reported the rate of enterprises applying preventive vaccinations as 64.9%. Özyürek et al. (2018) reported that 93.0% of enterprises regularly vaccinate their animals.

When Table 4 was examined, it was determined that lamb death was observed at a rate of 75% during the lactating process in the enterprises, and the causes of lamb deaths were characterized by diarrhea at the highest (60.0%) rate. In the literature, Kandemir et al. (2015) reported the causes of lamb death as hunger (19.2%), cold shock (44.8%), anemia (10.1%), and diarrhea (12.3%). Sahin and Olfaz (2019) reported that lamb deaths were related to the breeders (1.1%), old breeding sheep and rams (2.1%), blood changes (9.6%), cold climate (22.3%), insufficient care-feeding (63.8%), diseases and failure to vaccinate dams on time (1.1%). Öziş Altınçekiç (2014) determined the causes of death in lambs as the effect of inability to find the dam (3.45%), hunger (10.34%), diarrhea (20.70%), poor birth (31.03%) and cold (34.48%) in small enterprises, crushing (3.13%), hunger (9.37%), cold (28.12%), diarrhea (28.13%) and poor birth (% 31.25) in medium-scale enterprises, hunger (5.26%), crushing (10.53%), weak birth (13.16%), cold (34.21%) and diarrhea (36.84%) in large-scale enterprises.

## CONCLUSION

In this study conducted to determine and evaluate the level of animal welfare in sheep farming enterprises in the central district of Igdir province, it was found that resting areas and lighting and ventilation conditions in the enterprises were largely sufficient. However, this does not mean that animal welfare is fully ensured. Sheep farmers need to make further improvements in terms of animal welfare. In addition, it cannot be said that add-on compartments such as lamb, ram, lambing, sick animals, and milking compartments, which are related to animal welfare in various ways in enterprises, were also sufficient. Particularly, it was determined that sick animal compartments were insufficient. It was observed that the presence of the shearing sheds, footbaths, sheep baths, vehicle baths, loading ramps, and manager/caretaker's houses was insufficient. It was found that lame animals, udder abnormalities, and blind/saggy udder shapes were observed, and wild animal attacks were encountered. It was determined that parasite control was given importance and was usually performed by the injection method. Considering all these factors, it can be said that there is a need to increase the awareness of sheep farmers in terms of animal husbandry.

## ACKNOWLEDGEMENTS

We would like to thank the breeders who contributed to this study by answering the survey questions.

## AUTHOR CONTRIBUTIONS

The authors contributed equally to this study.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## STATEMENT of ETHIC

For this study; Permission was granted by Iğdır University Scıentific Research and Publication Ethics Board Headship for the appropriateness of this study (Meeting Date: 14.02.2024 and Meeting Number: 2024/5).

## REFERENCES

Andreasen, S. N., Wemelsfelder, F., Sandøe, P., Forkman, B., 2013. The correlation of Qualitative Behavior Assessments with Welfare Quality protocol outcomes in on-farm welfare assessment of dairy cattle. Applied Animal Behaviour Science, 143(1), 9-17.

Arıtunca, D., Karabacak, A., 2020. Konya merkez ilçelerinde koyunculuk işletmelerinin durumu. Bahri Dağdaş Hayvancılık Araştırma Dergisi, 9(1), 13-24.

Ben Salem, H., Smith, T. 2008. Feeding strategies to increase small ruminant production in dry environments. Small Ruminant Research, 77, 174–194. https://doi.org/10.1016/j.smallrumres.2008.03.008

Bilginturan, S., Ayhan, V., 2009. Burdur ili damızlık koyun ve keçi yetiştiriciler birliği üyesi koyunculuk işletmelerinin yapısal özellikleri ve sorunları üzerine bir araştırma. Hayvansal Üretim, 50(1), 1-8.

Bitzios, M., Fraser, I., Haddock-Fraser, J., 2011. Functional ingredients and food choice: Results from a dual-mode study employing means-end-chain analysis and a choice experiment. Food Policy, 36(5), 715-725.

Bostancı, M. M., 2006. Kırıkkale ilinde koyun yetiştiriciliğinin yapısal ve yetiştiricilik özellikleri. Yüksek Lisans Tezi, Fen Bilimleri Enstitüsü (Basılmış).

Bracke, M. B. M., 2009. Rope test may indicate efficacy of tail-biting treatments in growing pigs. Animal Welfare, 18(3), 263-266.

Çevikkol, E., Çam, M.A., Yılmaz, Ö.F., 2023. Çiftlik hayvanlari yetiştiriciliğinde refah ve stres kavrami. ISPEC 11th Internatıonal Conference on Agriculture, Animal Sciences and Rural Development, Muş, Türkiye, 03-05 March 2023.

Ceyhan, A., Şekeroğlu, A., Ünalan, A., Çınar, M., Serbester, U., Akyol, E., Yılmaz, E., 2015. Niğde İli koyunculuk işletmelerinin yapisal özellikleri ve sorunlari üzerine bir araştirma. Kahramanmaraş Sütçü İmam Üniversitesi Doğa Bilim Dergisi, 18(2), 46-58.

Elmaz, Ö., Ağaoğlu, Ö. K., Akbaş, A. A., Saatçi, M., Çolak, M., Metin, M. Ö., 2014. The current situation of small ruminant enterprises of Burdur province. Eurasian Journal of Veterinary Science, 30(2), 95-101.

Hamadani, H., Khan, A. A., Khan, H. M., Banday, M. T., Mir, M. S., Reshi, P., Sheikh, I. U. and Wani, S. A. 2023. Socioeconomic status of dairy farmers in the Srinagar district of Jammu and Kashmir. Asian Journal of Dairy and Food Research, https://doi.org/10.18805/ajdfr.DR-2065

Kandemir, Ç., Alkan, İ., Yılmaz, H. İ., Ünal, H. B., Taşkın, T., Koşum, N., Alçiçek, A., 2015. İzmir yöresinde küçükbaş hayvancılık işletmelerinin coğrafik konumlarına göre genel durumu ve geliştirilme olanakları. Hayvansal Üretim, 56(1), 1-17.

Karadaş, K., 2018. Koyunculuk işletmelerinin sosyo-ekonomik durumu; Hakkâri ili örneği. Atatürk Üniversitesi Ziraat Fakültesi Dergisi, 49(1), 29-35.

Kaygısız, A., Yılmaz, İ., Taşan, K.E. 2023a. Sinop ilinde keçi işletmelerinin sürü yönetimi ve hayvan refahına uygunluğunun incelenmesi. Uluslararası Tarım ve Yaban Hayatı Bilimleri Dergisi, 9(3), 477-489. https://doi.org/10. 24180/ijaws.1303590

Kaygısız, A., Yılmaz, İ., Ceylan, S. 2023b. Mersin ilindeki keçi işletmelerinin hayvan refahı bakımından değerlendirilmesi. Mustafa Kemal Üniversitesi Tarım Bilimleri Dergisi, 29 (1), 1-13. https://doi.org/10.37908/mkutbd.129638

Keskin, M., Bebek, D. T., 2018. Mersin ilinde koyun yetiştiriciliğinin mevcut durumu bazı verim ve yapısal özellikleri. Mustafa Kemal Üniversitesi Ziraat Fakültesi Dergisi, 23(2), 315-323.

Koyuncu, M., Öziş Altınçekiç, Ş., 2010. Keçilerde refah. Ulusal keçicilik kongresi, Çanakkale, Türkiye, 24–26 Haziran 2018, Sayfa no: 97-100

Liang, Y., Cheng, Y., Xu, Y., Hua, G., Zheng, Z., Li, H., Han, L., 2022. Consumer preferences for animal welfare in china: optimization of pork production-Marketing Chains. Animals, 12(21), 3051.

Ortega, D. L., Hong, S. J., Wang, H. H., Wu, L., 2016. Emerging markets for imported beef in China: Results from a consumer choice experiment in Beijing. Meat Science, 121, 317-323.

Öziş Altınçekiç, Ş., 2014. Bursa ili koyunculuk işletmelerinin yapısal özellikleri ve refah ölçütleri açısından değerlendirilmesi. Uludağ Üniversitesi, Fen Bilimleri Enstitüsü, Doktora Tezi (Basılmış).

Özyürek, S., Türkyılmaz, D., Dağdelen, Ü., Esenbuğa, N., Yaprak, M., 2018. Erzincan ili koyunculuk işletmelerinin yapısal özellikleri ve sorunlarının işletme büyüklüğüne göre incelenmesi. Akademik Ziraat Dergisi, 7(2), 219-226.

Phillips, J. C., Ortega, A., Cook, M., Concepcion, M., Kimmons, T., Ralph, K., Baldwin, S., 2010. Activism and trust: Animal rights vs. animal welfare in the food supply chain. Journal of Food Distribution Research, 41(856-2016-58034), 91-95.

Şahin, Y., Olfaz, M., 2019. Tokat Bölgesi koyunculuk işletmelerinde uygulanan yetiştiricilik ve kuzu büyütme uygulamalarinin incelenmesi. Black Sea Journal of Agriculture, 2(3), 171-180.

Şahinli, M., 2014. Koyunculuk sürü yönetimi: Karaman ili örneği. Anadolu Tarım Bilimleri Dergisi, 29(2), 113-120.

Savaş, T., Tölü, C., Akbağ, H.I., Coşkun, B., Yurtman, İ.Y., 2010. Tırmanma oğlaklar için davranışsal bir gereksinim mi? Ulusal Keçicilik kongresi, 24–26 Haziran 2010, Çanakkale.

Savaş, T., Yurtman, İ. Y., 2008. Hayvan davranış bilimi ve zootekni: tanım ve izlem. Hayvansal Üretim Dergisi, 49(2), 36-42.

Serttaş, İ., Akbaş, A. A., Mehmet, S. A. R. I., 2022. Afyonkarahisar ili Hocalar ilçesindeki küçükbaş hayvancılık işletmelerinin mevcut durumunun belirlenmesi. Veterinary Journal of Mehmet Akif Ersoy University, 7(1), 34-42.

SPSS 2011. SPSS for Windows, Version 20.0, IBM SPSS Inc., Chicago, US.

Sucu, E., Akbay, K. C. Filya, İ. 2015. Ruminantlarda sıcaklık stresinin metabolizma üzerine etkileri. Atatürk Üniversitesi Veteriner Bilimleri Dergisi, 10(2), 130-138. https://doi.org/10.17094/avbd.38896

Tüfekçi, H., Olfaz, M., 2015. Kastamonu ili küçükbaş hayvan yetiştiriciliğinin sorunları ve çözüm önerileri. Türk Tarım Gıda Bilim ve Teknoloji Dergisi, 3(7), 577-582.

Ünal, N., 2010. Yetiştiricilikte hayvan refahının ölçülmesi. III. Ulusal Veteriner Zootekni Kongresi, Afyon, s. 100.

WOAH, 2022. Hayvan Refahı (Erişim tarihi: 5 Ocak, 2023). https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-welfare/#ui-id-1.

Yamane, T., 2010. Temel örnekleme yöntemleri. Kitap. Literatür Yayıncılık. ISBN: 9789758431342, III. Baskı, İstanbul

Yılmaz, Ö.F., Çam, M.A., 2023. Küçükbaş hayvanlarda sicaklik stresinin refah ve verim üzerine etkileri. 7. International Congress on Scientific Research Mingachevir State University, Mingachevir, Azerbaijan, 24-25 February 2023.