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ORIGINAL PAPER

ANALYSIS OF TECHNICAL STRUCTURE OF SMALL RUMINANT FARMS: ŞIRNAK PROVINCE SAMPLE

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Abstract

This study aimed to determine the technical structure of small ruminant farmers in Şırnak province. Data was collected with a survey. The sample size was determined by the stratified sample method and was calculated as 128 small ruminant farms in Silopi, Idil and Cizre districts, where sheep breeding is concentrated. The data was collected between March 2016 and February 2017. On average, farmers own 195.77 decares (195770 square meters), of farmland. Various crops were grown in the enterprises. Wheat, barley, clover and cotton were the most common. In the enterprises, there was 125.14 BAU (Bovine Animal Unit) animals. 99.18% of the animals were small ruminants. 99.22% of the farmers graze their animals in the pasture. Farm animals typically graze from the 22nd week to the 42nd week of the year. There were closed barns in all of the farms. The average size of the barns was 154.95 m2. It was determined that light and ventilation be sufficient. 5560.31 hours of labour was used annually in small ruminant breeding farms, and most of this labour was related to grazing and milking operations. 99.22% if businesses carried out breeding only in certain months of the year. While various diseases were found in sheep and goats, veterinarians were consulted and utilised in illnesses and grafting. There was an average of 621.45 head of mature sheep and goats in the enterprises. The average number of small ruminant animals that produced milk was 830.83 head, which constitutes 64.74% of the total livestock. The mean duration of lactation for goats was 151.51 days; for sheep, 123.20 days. The average milk yield was 0.92 litres per head per day. In the enterprises, 2.09 kg of fleece was obtained per animal per year, on average.

Key words: Small ruminant, Farmer, Socio-Demographic, Şırnak, Turkey

INTRODUCTION

Small ruminant enterprises are generally preferred over larger ruminants due to constraints like care, housing and nutritional needs. In regions with unfavourable climate and geographical conditions, goat breeding is more commonplace (Dellal, 2000).

Şırnak province had 202,070 head of small ruminants in 2000. In 2000, milk production amounted to 5,444 tons. Şırnak province's share of Turkey's sheep in 2000 was 0.6%; this rate increased to 2.3% in 2017. Şırnak's share of Turkey's milk production in 2000 was 0.5%. It increased to 3.0% in 2017. The presence of small ruminants in Şırnak, as a percentage of Turkey as a whole, increased between the years 2000-2017. In 2017, there were 1,037,065 small ruminants in Şırnak province, and 55,469 tons of milk were produced. The number of small ruminants increased 5.13 times between 2000 and 2017 and milk production increased by 10.19 times. Şırnak's increase in small ruminant production was above the average of Turkey as a whole (TUİK, 2018).

In Şırnak province in 2017, 54.52% of the total small ruminants are sheep, while goats constitute 45.48%. The 54.50% of the total small ruminants are native sheep, 45.41% are native goats, 0.07% are mohair goats, and 0.02% are merino sheep. 99.96% of the sheep are native breeds,

and 0.04% are merino sheep. 99.84% of the goats are native breeds, and 0.16% are mohair (TUİK, 2018)

In 2017, total sheep assets were 565,389. 23,057 of the sheep were younger than six months, 37,711 were between 6-12 months old, 120,258 were between 12-24 months of age, and 366,520 were older than 24 months. 17,843 of those older than 24 months were rams (TUİK, 2018).

In 2017, the total number of goats were 471,676. 23,057 of the goats were younger than six months old, 36,403 of them were 6-12 months old, 107,540 of them were 12-24 months old, and 292,488 of them were 24 months or older. 13,296 of those older than 24 months were male (TUİK, 2018).

Although there are many studies in the related small ruminant breeding literature, there are no studies in Şırnak province. Some national studies on the study can be summarised as follows.

Direk et al. (2000) used the results obtained from questionnaires from 45 farms in the survey conducted to determine the structural characteristics of sheep farms in Konya. It was reported that 63.60% of the herd composition was milking animals, 21.17% was yearlings, 13.47% was a lamb, and 1.76% was ram. They found that the farms used an extensive sheep breeding, feeding of the sheep was based on pasture, and additional feeding was done in the winter months. Farmers generally reported that the sheep were a secondary source of income and healthcare practices were inadequate, shelters were primitive, and breeder's knowledge was inadequate.

Koyun (2001) investigated the current state, technical, economic and structural characteristics of sheep breeding in the Hatay region. It was found that 61.4% of farms produced milk, 29.3% produced meat, and 9.9% were producing milk and meat. 76.4% of sheep populations were made of Awassi, 22.6% were of other sheep breeds. 30% of the sheep were raised on the farm, 1.4% were pasture raised, 65.7% used both pasture and farmland and 2.8% were migrant sheep. The most critical problems in the region's enterprises were expressed as the inability to market their manufactured products at value prices, the inadequacy of pastureland, high feed prices, the inadequacy of capital, the inadequacy of credit supply and quantity, health problems and shortcomings in the organisation of farmers.

Şahin (2001) determined the economic analysis of the sheep farms in the province of Van province. He collected data from 63 farms selected by stratified random sampling method in 12 villages in Van. He found that 56.92% of the active capital consists of the land capital, and 43.08% was the operating capital. The most significant portion of the operating capital (78.0%) was composed of animal capital. 87.63% of the active capital in the enterprises was composed of equity capital. 64.60% of the gross income in the enterprises surveyed were composed of animal production. Nearly half of total operating costs (49.64%) were labour costs. 67.8% of the gross production value of the sheep production branch in the examined enterprises was composed of lamb production value. This was followed by an elderly sheep sales value of 15.4% and milk production value by 14.4% respectively.

Dağıstan (2002) examined the agricultural enterprises operating in the Central-South Anatolian Region and the economic structure and problems of sheep farming activities of these enterprises. In the enterprises in the region, sheep production accounted for 52% of the gross capital, and 16.93% of income was derived from milk production. 29% of the enterprises surveyed have calculated that they have negative net profits. It was estimated that approximately 40,000 workers would be unemployed if profit-losing enterprises were liquidated. He found that the most significant share of production costs for sheep farming was labour costs at 32.05%, and that feed costs accounted for 23.01% of total costs. He also stated that the businesses were paying 30.67% of their income to cover interest on loans, which was very high and will be a problem in the future development of the sector. The main factors influencing the success of the operation were the number of sheep and the family labour force used in operation. In order for the sheep breeding activity to develop, it firstly suggested that the herd size should be increased above 50 sheep and that the family workforce was used more efficiently.

Kaymakçı et al. (2005) studied the structural properties of small ruminant animal husbandry in Turkey and examined the economic policies implemented in this branch of production. The aim of organising small ruminant breeding in public supervision was to establish breeders' associations for this purpose and thus to increase productivity. In the mid and long term, cooperatives of producers need to grow and unify small and dispersed businesses. In the short term, meat, milk, wool and mohair subsidies to bolster prices were needed.

Bilginturan (2008) conducted survey studies with 194 sheep production and 40 goat production enterprises in Burdur. He found that daily milk yield per sheep was 0.448 litres, and the average milk quantity per goat was 0.333 litres. It was found that at sheep enterprises, 53% of the sheep had closed barns, 39.7% had shade houses. At goat enterprises, 65% had closed barns, and 32.5% had shade houses. He found that the farmers ensured all animals had all their protective immunisations.

Yildiz (2011) obtained the survey method data from 168 small ruminant farms in Van province. The average age of the farmers was 48.75 years. The number of family members in each farming family was, on average, 9.68. The average irrigated land assets of small ruminants enterprises were determined to be 51.66 decares, and the average non-irrigated land assets were determined to 75.17 decares. The study found that 69% of the growers had an elementary school education, 3.6% had a high school education, and 10.7% were illiterate. 51.8% of the shelter building materials were adobe, and 33.3% were from brick. The majority of the enterprises (84.5%) came together to form a common herd. Depending on the size of the herd, either one family member from each enterprise works as a shepherd, or someone was hired either permanently or on a temporary basis. The daily milk yield per animal was typically 0.3 to 0.6 kg. The businesses reported that they would benefit from free veterinary services, long-term loans, better breeding stock and price stability in products. The difficulty of finding workers, the inadequacy of veterinary services, the low number of young people in this field and the rapid increase in migration to big cities were among the problems.

Koca (2014) studied the structure of sheep farms operating in Karaman province with data obtained from 61 farms. It was found that the average animal presence per farms was 9.29 bovine animal units (BAU), with an average of 122.18 decares per farms. 67.78% of the active capital was in the form of land, 32.22% in the form of liquid assets, and the share of the equity capital out of passive capital was 93.24%. The financial profitability was calculated to be 13.51%, and the economic profitability was calculated to be 12.59%.

Techniques applied by small ruminants breeding enterprises can affect production either directly or indirectly. The technical structure of the business plays a vital role in the increase of the income obtained by influencing the production efficiency and therefore its profitability. Therefore, this study’s aims were examined the technical structure of small ruminants breeding in Şırnak province.

MATERIALS AND METHODS

The main material of this study was the data obtained via survey. Şırnak Central, İdil, Silopi and Cizre districts are the regions where sheep breeding is concentrated. The survey was conducted in these areas. This study was also benefited from research conducted in the national and international context. The data used in the research were for the production period of 2017 (March 2016 - February 2017).

Enterprises used to conduct the survey were selected through random sampling since it was not economically feasible to survey every relevant enterprise in the province. In the selection of the enterprises, four essential districts were taken into account in respect of the existence of small ruminants. These districts contain 76.7% of the total small ruminant farms in the area. In the selection of this data, it can be said that these counties are included in the scope of sampling, and small-scale breeding enterprises are represented. The ideal number of enterprises interviewed by the

stratified random sampling method was calculated to be 128 enterprises, with a 5% margin of error and a 95% confidence interval. One of the main reasons for the application of this sampling method is that the business groups have a more homogeneous structure. Thus, the results were more likely to be applicable. These groups were divided into four groups according to their frequency distribution. Distribution of sample enterprises according to strata was done with the Neyman Method. According to this method, the first group of small enterprises (43 in total) was made up of enterprises with 250 or fewer small ruminants. Group II contained 22 enterprises, each of which had 251-500 small ruminants. Group III contained 21 enterprises, each of which had 501-999 small ruminants. Group IV contained 52 enterprises, each of which had over 1,000 small ruminants. Populations were randomly selected to calculate the sample size.

The bovine animal unit (BAU) was used to calculate the number of foraging animals in the enterprises, and the coefficients used in calculations were given in Table 1 (Erkuş et al., 1995). The data were presented in cross-tabular form considering the animal groups and the results interpreted.

Table 1. Coefficients used for conversion to bovine animal unit (BAU)

Species	Coefficient	Species	Coefficient
Cow	1.00	Sheep, 6-12 months	0.08
Bull	1.40	Sheep, under 6 months	0.05
Calf, under 6 months	0.16	Billy goat	0.12
Calf, 6-12 months	0.50	Nanny goat	0.10
Heifer	0.70	Goat, 6-12 months	0.08
Ram	0.12	Goat, 0-6 months	0.05
Ewe	0.10	Poultry	0.004

RESULTS AND DISCUSSION

Some characteristics of the enterprise farmers were given in Table 2. The average age of the small ruminant breeders surveyed was 49.98 years. The farmer's survey averaged 4.25 years of experience in plant production. In the region as a whole, these figures were 48.84 years and 5.71 years, respectively. Age of farmers in the investigated region was close to findings of Karaca et al. (1993) in Eastern Anatolia (49.42 years), Dellal (2000) in the Antalya province (51.6 years), Dağıstan (2002) in the Central-South Anatolian region (45.99 years), Koyuncu et al. (2006) in Çanakkale province (47 years), Bilginturan (2008) in Burdur province (46.54 years in the enterprises with sheep production activity and 50.30 years in the enterprises with goat production activity), Yildiz (2011) in the Van province (48.75 years). On the other hand, the age of the farmers in the region was higher than in Hakkâri province (43.32 years) (Deniz, 2009) and Bitlis province (Sezgin, 2006) (44 years).

The average farmer in this study was found to have had 13.37 years of experience in sheep production and 13.32 years of experience in goat breeding. An average of 12.25 years in sheep production and 12.17 years in goat breeding was the regional average. The farmers' experience of large-scale groups was higher than small-scale groups (Table 2).

The experience levels in the sheep-goat breeding of the regions were very low compared to the findings of Dellal (2000) in Antalya (33.6 years) and Dağıstan (2002) in the Central-South Anatolian region (24.14 years).

The farmers' experience level in sheep production activity in the region was close to the finding of the study done in Hakkâri province (19.31 years) (Deniz, 2009).

It was determined that the experience of the enterprises in sheep farming was higher than plant production experience.

Table 2. Some features related to the farmers

Groups	Operator age (years)	Experience in plant production activity (years)	Experience in sheep production activity (years)	Experience in goat production activity (years)
I	48.19	6.00	11.35	11.21
II	47.86	5.64	11.73	11.73
III	53,14	6.29	16.86	16.86
IV	51,33	0.71	14.55	14.55
BA	49.98	4.25	13.37	13.32
RA	48.84	5.71	12.25	12.17

BA: Business average
RA: Regional weighted average

The amount of land owned by the interviewed enterprises was 195.77 decares in the survey area on average. The total farmland varies between 128.72 decares and 258.29 decares among the business groups. As business groups increase, the total farmland also increases. It was determined that the number of parcels of farmlands was 9.46 on average. This value varied between 7.26 and 12.14 in the business groups. The average parcel size in the interviewed enterprises was 19.63 decares. The size of the plot varies between 15.05 and 23.65 in the business groups (Table 3).

It was determined that 69.72% of the total farmland was composed of non-irrigable land and 30.28% was irrigable land. On average, 162.30 decares of the farmland was owned while the farmer leased to 33.48 decares. In the surveyed areas, there were no operations in the shared land.

In the study conducted in Hakkâri province, it was found that the farmland of the farmers were 7.44 decares, 73.5% of the total was owned land, the parcel number was more than ten, and the parcel size was 0.73 decares (Deniz, 2009). In the study conducted in Antalya province, it was reported that the farmland was 39.47 decares (Dellal (2000), while in the province of Kahramanmaraş farmland was 21.38 decares, the number of parcels was 2.29, and the average parcel size was 9.31 decares (Paksoy, 2007). Dağıstan (2002) found that the average farmland was 161 decares, 74.53% of the total land was non-irrigable, and 77.02% of the land was owned land.

Table 3. Land parcel structure in enterprises

Groups	Total land (da)	Total number of parcels of land (pieces)	Average parcel size (da)
I	128.72	7.26	17.44
II	155.43	9.82	15.05
III	250.29	12.14	21.44
IV	258.29	10.19	23.65
BA	195.77	9.46	19.63
RA	155.86	8.62	17.59

da is decares, equal to 0.1 hectare

The production patterns of the enterprises in the region were given in Table 4. In the enterprises, wheat was planted at an average of 68.57 decares. Barley followed this with 45.13 decares, clover with 30.66 decares and cotton with 14.07 decares. In the average of the enterprises, it was determined that 21.69 decares were fallow land during the cultivation season. It was determined that 35.03% of the farmland consist of wheat land, 23.05% of barley, 16.66% of alfalfa and 7.19% of the cotton land. The product with the least land in cultivation was cucumber with 0.22%, while fallow land constituted 11.08%.

Table 4. Production patterns in enterprises

Crop	Groups				**BA**	**RA**
	I	**II**	**III**	**IV**		
	Amount (da)					
Wheat	40.35	34.77	92.14	103.38	68.57	47.98
Barley	22.09	37.68	79.43	55.48	45.13	34.41
Clover	21.35	34.77	33.38	36.67	30.66	26.87
Cotton	11.19	9.55	6.67	23.10	14.07	10.76
Corn	4.65	14.09	1.43	2.81	5.14	6.56
Lentil	6.40	0.00	1.43	1.43	2.85	3.96
Watermelon	0.88	3.05	2.76	3.29	2.35	1.76

Tomato	4.16	2.00	2.14	0.48	2.25	3.21
Grape	0.79	0.68	1.81	1.60	1.20	0.92
Melon	1.02	0.73	0.24	0.95	0.82	0.85
Pistachio	0.81	0.50	0.24	0.67	0.62	0.66
Cucumber	0.44	0.73	0.57	0.17	0.42	0.52
Fallow	14.58	16.88	28.06	28.29	21.69	17.39
Total farmland	128.72	155.43	250.29	258.29	195.77	155.86

The presence of buildings, machinery, and equipment in enterprises

Information on the buildings, tools and machines of the businesses interviewed in the area was given in Table 5. The average size of houses in the interviewed enterprises was calculated as 179.27 square meters. The average size of the enclosed barns owned by the enterprises was 154.95 square meters, whereas the semi-open barns were 464.90 square meters. While the average size of the hay barns, where businesses keep products such as straw, feed etc. in animal breeding was 51.63 square meters, the warehouse sizes in which they keep various material ammunition was 154.95 square meters. It was found that that the houses where business owners reside were 21.16 years old on average. The average number of tractors in the business was 1.65. This number ranges between 1.30 and 2.24 among the business groups. The number of attachments for the tractors owned by the enterprises was determined as 6.66 units on average. The enterprises had 3.82 other machines on average.

Table 5. Information on buildings, tools and machines owned by the enterprises

Buildings	Groups				BA	RA
	I	**II**	**III**	**IV**		
House size (m^2)	173.98	179.73	184.76	181.69	179.27	177.07
Closed barn size (m^2)	30.28	91.55	171.76	307.40	154.95	75.13
Size of semi-open barn (m^2)	90.98	274.68	515.24	922.19	464.90	225.47
Hay barn size (m^2)	10.07	30.55	57.19	102.43	51.63	25.03
Warehouse size (m^2)	30.28	91.55	171.76	307.40	154.95	75.13
House age (years)	21.23	19.45	22.81	21.17	21.16	20.97
Closed barn age (years)	17.33	15.32	15.43	16.67	16.45	16.56
Semi-open barn age (years)	9.00	9.59	7.05	13.02	10.10	9.09
Hay barn age (years)	6.49	6.77	5.00	9.29	7.21	6.51
Warehouse age (years)	5.19	5.45	4.10	7.24	5.73	5.22
Tractor	1.30	1.50	2.24	1.79	1.65	1.49
Tractor attachments	5.21	6.00	8.95	7.36	6.66	5.96
Other tools and machines	2.88	3.95	5.10	4.07	3.82	3.47

The agricultural organisation, indebtedness, and use of credit

The membership of the agricultural organisations, indebtedness and credit utilisation of the farmers interviewed in the research area were given in Table 6. The 82.81% of the farmers interviewed were members of cooperatives. The 17.19% of them declared that they were not a member of any cooperative. Within the business groups, the likelihood of being a cooperative member varied between 65.12% and 100.00%. The 31.25% of the enterprises interviewed were not members of any producer association. Within the business groups, the status of being a member of the producer association varied between 44.19% and 95.24%. About 50.78% of the farmers declared that they had debts. Group III had no debts, whereas the highest rate (97.62%) was Group IV. The 1.59% of the farmers declared that their indebtedness in the last five years decreased, 4.76% reported that it remained the same, and 93.75% declared that they had more debt (Table 6).

About 31.25% of the farmers declared that they used credit. (Table 6). It was estimated that 28,085.94 TL credit was used in the average of the enterprises. Within the business groups, the loan amount varied between TL 27.27 and TL 82,976.19. Group I had no credit use. Group IV enterprises had the highest amount of credit within the groups. On average, the most recent credit was obtained in 2013. Group II had the most recent credit usage, 2017.

Table 6. Membership, indebtedness, and use of credit for agricultural organisations

	Groups				BA
	I	II	III	IV	
Cooperative member	65.12	90.91	100.00	88.10	82.81
Producer association member	44.19	59.09	95.24	85.71	68.75
Loan status	39.53	31.82	0.00	97.62	50.78
Credit usage status	0.00	4.55	28.57	78.57	31.25

Animal assets of farmers

There was 779.09 head of sheep on average in the enterprises interviewed in the survey. Sheep was between 12-24 months average 278.95 head, lambs under six months was average 266.55 head. Also, there was an average of 770.75 goats in the enterprises. Goats were between 12-24 months average 342.50 head. In the enterprises, the total number of small ruminants averages 1283.30 head. While the number of breeding sheep and goat sheep was 621.45 in the average, it ranged from 119.00 to 1230.05. The number of head of small ruminants varied between 240.44 and 2543.90 in the business groups. There was 0.70 head of bulls on the average. Besides these, the businesses being interviewed also had bees, poultry and working animals (e.g. horse, dog). These were 2.45 hives, 20.59 poultry and 1.07 working animals on average.

The animal assets of the enterprises surveyed were given in Table 7 regarding the bovine animal unit (BAU). There was 60.32 BAU of sheep on average. There was a 27.89 BAU adult sheep. This was followed by 13.33 BAU of lambs between 0-6 months old. Also, there was 63.71 BAU of goats. There was 34.25 BAU of adult goats. There was 13.33 BAU of goats under six months old. The total number of small ruminants in the enterprises was 124.03 BAU. The presence of small ruminants animals varied between 24.09 BAU and 246.22 BAU among the business groups. The average total animal presence in the enterprises was 125.14 BAU. Within the business groups, animal assets ranged from 26.38 BAU to 246.54 BAU.

Deniz (2009) found that farmers had 10.82 BAU total animals on average and 88.53% of these animals were small ruminants in Hakkâri. Paksoy (2007) calculated as having 10.28 BAU small ruminants in Kahramanmaraş, Dellal (2000) calculated 24.06 BAU small ruminants in Antalya, Çıtak (2011) declared 14.60 BAU small ruminants in Çanakkale and Sahin (2001) found 11.94 BAU small ruminants in Van.

In the average of the enterprises, 48.21% of animals were sheep, and 50.91% were goats. 0.44% of the animals were cattle, 0.38% were working animals, and 0.07% were poultry. According to this, 99.11% of the animal assets of the enterprises were small ruminants. The presence of young goats varied between 20.20% and 30.38% in business groups. Adult sheep were 22.89% of the animal assets. This varied between 20.25% and 24.92% in business groups. The percentage of small ruminant animals in the business groups ranged from 91.34% to 99.87%.

Table 7. Livestock assets of enterprises regarding BAU

Animal	Groups				BA	RA
	I	II	III	IV		
	BAU/ Business					
Ram	0.27	0.47	0.35	3.13	1.25	0.46
Adult Sheep	6.57	16.76	27.97	55.52	27.89	13.90
Male Sheep, 6-12 months	0.26	0.67	1.12	2.21	1.11	0.55
Female Sheep, 6-12 months	2.10	5.36	8.95	17.77	8.93	4.45
Sheep (12-24)	1.84	4.69	7.83	15.55	7.81	3.89
Lamb, 0-6 months	3.14	8.01	13.36	26.52	13.33	6.64
Total Sheep	14.18	35.97	59.58	120.69	60.32	29.89
Adult Goat	5.33	19.99	41.94	67.49	34.25	16.21
Billy goat	1.60	6.00	12.58	20.25	10.28	4.86
Goat 6-12 months	0.85	3.20	6.71	10.80	5.48	2.59
Kid, 0-6 months	2.13	7.99	16.78	26.99	13.70	6.48
Total Goats	9.91	37.17	78.01	125.52	63.71	30.14
Total small ruminants	24.09	73.15	137.59	246.22	124.03	60.04
Bull	0.81	0.00	0.00	0.00	0.27	0.47
Cow	0.42	0.00	0.00	0.00	0.14	0.24

Heifer	0.28	0.00	0.00	0.00	0.09	0.16
Calf, 6-12 months	0.00	0.00	0.00	0.00	0.00	0.00
Calf, 0-6 months	0.11	0.00	0.00	0.00	0.04	0.06
Total Cattle	1.62	0.00	0.00	0.00	0.54	0.94
Poultry	0.08	0.08	0.10	0.08	0.08	0.08
Working animals	0.59	0.82	0.39	0.25	0.48	0.61
Total animal presence	26.38	74.05	138.08	246.54	125.14	61.67

Small ruminants breeding system

The types of livestock produced by the enterprises interviewed in the research area were given in Table 8. About 94.53% of the enterprises only raise small ruminants. The 5.47% stated that they raised cattle as well.

Table 8. Type of livestock in enterprises surveyed

Groups	Only small ruminants	With cattle and small ruminants	Total
	Number of enterprises		
I	36	7	43
II	22	0	22
III	21	0	21
IV	42	0	42
Total	121	7	128
	%		
I	83.72	16.28	100.00
II	100.00	0.00	100.00
III	100.00	0.00	100.00
IV	100.00	0.00	100.00
Total	94.53	5.47	100.00

About 99.22% of the enterprises surveyed in the region were engaged in animal husbandry for meat and milk production. The 0.78% of them reported that they breed animals only for meat production. An average of 86.72% of the surveyed enterprises used the income they earn to meet nutritional needs. 2.34% use this income for clothing needs, and 10.94% to meet other needs.

Statements about the adequacy of income obtained by the interviewed enterprises in the region were given in Table 9. According to this, 80.47% of the enterprises stated that the income from farming was not enough. It was noteworthy that all of the businesses groups were not satisfied with the income they earn. 19.53% of the enterprises declared that the income they obtained from small ruminants breeding was sufficient.

Table 9: Sufficiency of farm income for farmers

Groups	Yes, enough	No, not enough	Total
	Percent (%)		
I	0.00	100.00	100.00
II	4.55	95.45	100.00
III	0.00	100.00	100.00
IV	57.14	42.86	100.00
Total	19.53	80.47	100.00

Labour use

It was determined that the average annual working hours was 5,560.31. This ranged from 4,696.74 to 7,208.57 hours in the business groups. The highest share of labour used in breeding in the enterprises was grazing (1,398.38 h). This followed by milking (1,159.59 h), watering (683.16 h), and feeding (603.56 h). The lowest labour utilisation rate was determined as marketing.

The small ruminant breeding environment in enterprises

The characteristics related to the shelter of animals in the enterprises were given in Table 10. According to this, it was determined that ventilation was present in 85.16% of the shelters and there was no ventilation in 14.84%. Ventilation availability varies between 76.74% and 92.86% in business groups. Group IV had the most ventilation. Group I had the least ventilation. On average 80.47% of the shelters were found to be adequate in ventilation, and 19.53% were inadequate. On

average, 87.50% of the shelters had lighting, and 12.50% did not. The presence of light ranged from 77.27% to 90.48% in business groups. On average, 67.97% of the shelters were found to be to have adequate lighting, and 32.03% were insufficient.

Table 10. Shelter characteristics and pasture grazing status

Shelter features	Groups				BA
	I	**II**	**III**	**IV**	
Ventilation availability	76.74	81.82	90.48	92.86	85.16
Ventilation adequacy	72.09	90.91	90.48	78.57	80.47
Lighting availability	88.37	77.27	90.48	90.48	87.50
Lighting adequacy	65.12	50.00	80.95	73.81	67.97
Grazing status	97.67	100.00	100.00	100.00	99.22

The 99.22% of the enterprises were grazing in the mountains, while 0.78% stated that they do not. It was determined that on average 42.19% of the enterprises grazed on Ferasin plateau, 39.06% on other mountains and 17.97% grazed close to the village only.

The 91.41% of the enterprises begun grazing during the 22nd week of the year. 7.03% begun during the 23rd week. 91.41% of businesses ended grazing during the 42nd week, 7.03% during the 46th week. Yildiz (2011) stated the grazing period for seven months in Van. Dağıstan (2002) found that the grazing time varied from 159-199 days.

The 78.91% of the enterprise's interview stated that they started to graze in the past at 05:00 in the morning and 17.97% at 06:00 in the morning. On average, 48.44% of businesses reported that they returned at 18:00 hours, 39.84% at 17:00 hours and 5.47% at 16:00 or 19:00 hours.

On average, 99.22% of the enterprises interviewed in the study area reported that they were participating in seasonal periods (mating) within a specified period of the year and 0.78% of them had year-round mating instead of seasonally. Yildiz (2011) stated that all farms used artificial insemination in Van.

On average, 98.44% of the farmers were cared for the animals by a veterinarian, and 1.56% of the businesses stated that they did not have any veterinarians. On average, 71.88% of farmers stated that veterinarians were consulted about medicine use, 48.44% of farmers consulted with other breeders, and 28.13% stated that they gave medicine without consulting anybody.

Milking, lactation time, and shearing

The 98.44% of the farmers interviewed stated that they were milking their animals twice a day, in both morning and evening; 1.56% that they milked their animals once a day. In the study conducted by Yildiz (2011) in Van, 75.6% of the farmers milked once a day, and 22.6% milked twice a day.

Information on the number of milking animals obtained from the enterprises interviewed was given in Table 11. The number of goats milked in the enterprises was determined to be 342.50 head on average, alongside an average of 488.33 head of sheep. The total number of small ruminants milked in the enterprises was determined to be 830.83 head, on average. This number ranges from 168.44 to 1646.64 in the business groups. It was estimated that 64.74% of the total small ruminants were being milked. The average sheep milk yield in the enterprises was 53,810.22 litres per year. The average goat milk yield was 51,625.22 litres per year. The average milk obtained from goats and sheep in enterprises was 105,435.44 litres per year. An average of 126.90 litres of milk was obtained per animal, per year. The average lactation period per goat was determined to be 123.20 days and 151.51 days for sheep. The average lactation duration in goat and sheep milk production was calculated as 137.36 days (Table 11).

The mean daily milk yield was found to be 0.92 kg per animal from the mean lactation time (Table 11).

Deniz (2009) found milk yield in Hakkâri province to be 0.28 kg per day per animal and 47.59 kg per year. In the study conducted by Yıldız (2011) in Van, the total average milk yield per sheep and goat during the milking period in the livestock breeding enterprises was determined to be 38.89 kg. Dağıstan (2002) calculated as 0.409 per head.

The lactation period was calculated as 172.08 days in Hakkâri (Deniz, 2009), 100 days in Central-South Anatolia region (Dağıstan, 2002), and 95.19 days in Antalya (Dellal, 2000).

Another product obtained was the wool sheared from sheep. In all the enterprises, an average of 2,982.59 kg of fleece was obtained per year, or 2.09 kg of fleece per animal per year (Table 11). Wool production was found to be 2.41 kg per animal per year in Van (Yıldız, 2011), and 1.2 kg in Central-South Anatolia (Dağıstan, 2002).

According to the regional weighted average, the total number of milking sheep was 405.50 head, which constitutes 65.53% of total sheep. Daily yield per small ruminant was found to be 0.94 litres, and mean lactation time was 134.66 days. According to the region-weighted average, wool yield was 2.08 kg per animal per year (Table 11).

Table 11. Information on some products obtained from small ruminant breeding enterprises

Product	Groups				**BA**	**RA**
	I	**II**	**III**	**IV**		
Milking goat (head)	53.28	199.86	419.43	674.86	342.50	162.06
Milking Sheep (head)	115.16	293.50	489.62	971.79	488.33	243.44
Total milking animals(head) **A**	168.44	493.36	909.05	1646.64	830.83	405.50
Total small ruminants (head)**B**	240.44	755.73	1450.14	2543.90	1283.30	618.80
Total milking ruminants (%) **A/B*100=C**	70.06	65.28	62.69	64.73	64.74	65.53
Goat milk production (kg / operation)	11258.12	38183.18	78008.10	93462.12	53810.22	29751.30
Sheep milk production (kg / operation)	9916.88	24096.98	43243.50	112937.02	51625.22	22102.11
Total milk production (kg /operation) **D**	21175.00	62280.16	121251.59	206399.14	105435.44	51853.41
Sheep milk yield (kg / operation) **D/A=E**	125.71	126.24	133.38	125.35	126.90	126.75
Goat lactation time (days)	115.35	125.45	134.29	124.52	123.20	120.59
Sheep lactation time (days)	145.74	154.39	148.10	157.62	151.51	148.74
Mean ruminant lactation time (days)**F**	130.54	139.92	141.19	141.07	137.36	134.66
Average milk yield/day (kg / head) **E/F=G**	0.96	0.90	0.94	0.89	0.92	0.94
Wool (kg / operation)	639.12	1796.91	3316.71	5835.88	2982.59	1485.33
Wool (kg / head)	2.14	1.95	2.00	2.17	2.09	2.08

Problems Faced By Small Ruminant Breeder and Potential Suggestions

Participants were asked to discuss some problems related to small ruminants breeding. Farmers had the strongest agreement with high operating expenses affecting production with an average of 4.21 points. It was determined that they agreed that the government did not support the small animal husbandry support by 3.45 points, they had problems in marketing the milk, produced with 3.05 points, and they could not attract any credit with 3.04 points (Table 12).

Table 12. Farmers' views on problems related to small ruminant breeding

Problems	Groups				**BA**	**RA**
	I	**II**	**III**	**IV**		
I have high operating expenses	4.35	4.14	3.19	4.62	4.21	4.17
I think the government ’s support of small-scale animal husbandry is inadequate.	3.37	3.05	3.29	3.81	3.45	3.30
I am having problems marketing the milk I produce.	3.33	2.91	3.24	2.76	3.05	3.19
I do not get loans/credit for what I need	3.02	2.73	3.43	3.02	3.04	3.00
I cannot get paid for the milk on time.	2.81	3.27	3.62	2.71	2.99	3.02
Diseases and animal losses affect milk production negatively.	2.88	3.41	3.24	2.69	2.97	3.05
I am having difficulties providing quality feed.	2.79	2.95	3.48	2.62	2.88	2.91
I am having difficulty finding tools/machinery/supplies for small ruminants.	2.95	3.00	2.90	2.67	2.86	2.94
I do not manage financial debt well	2.70	2.68	2.95	2.95	2.82	2.74
I have problems with insufficient infrastructure.	2.95	2.59	2.71	2.45	2.69	2.81
I have inadequate technical knowledge.	2.72	3.05	2.71	2.21	2.61	2.78
I have some troubles with the Turkish-Veterinary system.	2.58	2.41	2.62	2.21	2.44	2.53
I have problems with bureaucratic transactions and collateral on loans given to producers.	2.00	2.18	2.52	2.36	2.23	2.12
I did not benefit from small ruminants support.	2.21	2.23	2.95	1.83	2.21	2.29
Organizations for small ruminant operations were insufficient.	2.23	2.55	2.33	1.33	2.01	2.28
I cannot control my financial situation	2.12	2.00	1.90	1.48	1.85	2.03
I do not know my costs	1.63	1.95	1.67	1.43	1.63	1.71

Scale	1 - Disagree strongly	2 – Disagree somewhat	3-- Neither agree nor disagree	4 - Agree somewhat	5--Agree strongly

Farmers were asked to rate some statements relating to small ruminant business situations on a scale of 1 to 5, with five strongly agreeing. Farmers agreed strongest with an average of 4.80 points that operating expenses were high and with an average of 4.61 points that governmental support for small ruminants farming affects the production decisions. Farmers agreed that small

ruminant breeding was an important source of income in the region with 4.23 points. There was also strong agreement that organising in the marketing of the products was essential (4.17 points), organising among small ruminant businesses was important (4.12 points) and that the technical knowledge in the small ruminants farming was inadequate (4.05 points). Inadequate technical knowledge also indicates that there were insufficiencies in infrastructure (Table 13).

Table 13. Farmers' views on some statements related to small ruminant breeding

Statement	Groups				BA	RA
	I	II	III	IV		
Operating expenses are high	4.56	4.77	4.95	4.98	4.80	4.68
Government support for small ruminant enterprises affects production decisions	4.42	4.73	4.62	4.74	4.61	4.54
Small ruminant breeding is an important source of income in the region	3.91	3.45	4.29	4.93	4.23	3.89
Organizing marketing is important to small ruminants products	3.58	3.77	4.24	4.95	4.17	3.77
Organizing is important in small ruminant businesses	3.65	3.45	4.43	4.79	4.12	3.74
There is a lack of technical knowledge in small ruminants breeding	4.09	3.55	3.81	4.40	4.05	3.93
Small ruminant breeding is also a hobby	3.65	3.14	3.52	4.95	3.97	3.56
Agricultural unions and cooperatives provide adequate informational support	3.44	2.73	3.33	4.95	3.80	3.31
The marketing situation of small ruminant products affects production	3.23	3.41	3.19	4.86	3.79	3.34
Climate change affects small ruminant breeding	3.28	2.91	3.00	4.93	3.71	3.23
Small ruminant breeding is more advantageous than crop breeding	3.02	2.86	3.29	4.43	3.50	3.07
There is a problem employing adequate labour in small ruminant breeding	2.86	2.91	2.33	4.95	3.47	2.90
It is hard to buy additional small ruminants	3.23	3.55	3.71	3.48	3.45	3.38
Small ruminant farming is a profitable activity	3.44	3.41	2.90	3.00	3.20	3.35
Agricultural organizations in small ruminants provides adequate information support	2.81	2.73	3.19	3.69	3.15	2.87
Small ruminant farming is a prestigious activity	3.28	3.05	3.00	3.07	3.13	3.18
Government supports for small ruminant farming influences production continuity	2.70	3.36	3.76	2.29	2.85	2.98
Small ruminant farming cannot be done without government support	3.05	2.50	2.81	2.71	2.80	2.87
Organization in small ruminants is sufficient	2.12	2.73	2.29	2.57	2.40	2.31
Knowledge of management (profit, loss, expense account, etc.) is sufficient	2.79	2.86	2.62	1.24	2.27	2.72
Raising small ruminants is easy	2.12	2.23	2.14	1.19	1.84	2.11
Government support for small ruminant farming is sufficient	1.51	1.95	1.67	1.76	1.70	1.65
Marketing infrastructure of small ruminant products is sufficient	2.05	2.05	1.52	1.19	1.68	1.95
There is no significant problem in small ruminants marketing	1.81	1.73	1.48	1.45	1.63	1.73
Government support for agriculture is sufficient	1.51	1.50	1.52	1.40	1.48	1.50
All producers are benefitting from support for small ruminant farming	1.44	1.82	1.38	1.14	1.40	1.52
Small ruminant infrastructure in business is sufficient	1.42	1.68	1.05	1.29	1.36	1.44

Scale	1 - Disagree strongly	2 – Disagree somewhat	3-- Neither agree nor disagree	4 - Agree somewhat	5--Agree strongly

Farmers expressed some problems related to small ruminant breeding. The 79.69% of the farmers reported that high pasture rents had a negative effect on production. About 74.22% of farmers reported that safety/security in the region made it difficult to find shepherds. 47.66% of the producers expressed difficulty in finding shepherds. 35.43% stated that imported animals in recent years had a negative effect on prices and production in the region. Also, they pointed out that the children were not able to access educational opportunities (22.40%) (Table 14).

Table 14. Some problems identified by the farmers in the region

Suggestions	Groups				BA
	I	II	III	IV	
The high of pasture rents	76.74	77.27	95.24	76.19	79.69
Safety of the pastures	60.47	72.73	80.95	85.71	74.22
Difficulty of finding a shepherd	34.88	63.64	66.67	42.86	47.66
Impact of imported animals on the market	39.53	50.00	38.10	21.95	35.43
Education of children	39.02	28.57	28.57	0.00	22.40

* More than one response.

Farmers were asked which proposals would aid small ruminant enterprises in the region. The 99.22% of the farmers stated that support policies for feed plants should be developed. 92.97% of farmers stated that governmental support for small ruminants enterprises should be increased. Also, 62.50% of farmers reported that reductions in the cost of operating expenses for agriculture would be beneficial. 50.00% reported that continuous changes in policies for animal husbandry negatively affected production. In other words, they suggest that the applied policies should not be continuously changed.

CONCLUSION

The average age of the small breeders interviewed was 49.98 years, and they had an average of 4.25 years of experience in plant production. On average, farmers interviewed in the region had 13.37 years of experience in sheep breeding and 13.32 years of experience in goat breeding. The amount of land owned by businesses interviewed in the study area was 195.77 decares on average. It was determined that the number of parcels of business land was 9.46, on average. The average parcel size in the interviewed enterprises was 19.63 decares.

The total number of small ruminant enterprises in the enterprises was 124.03 BAU. On average, 48.21% of animals on these enterprises were sheep, 50.91% goats, 0.44% beef cows, 0.38% working animals, and 0.07% poultry. According to this, 99.11% of animals were small ruminants.

The average lactation time was calculated to be 137.36 days. Mean daily lactation yield was found to be 0.92 kg.

Farmers have indicated that a significant portion of them was adversely affected by high operating expenses and that government support for small ruminant breeding affects their production decisions. The high rate of pasture rents in the study area affects the production negatively. It was observed that the producers have difficulties in finding shepherds, and the animals imported in recent years negatively affect prices and production in the region. Also, it was a fact that the farmers have to graze their animals for a long period of time, which means that their children cannot benefit from educational opportunities.

Many farmers made it clear that they want supportive policies to develop feed plants so that they can grow feed plants to offset their feed costs —which was one of the essential elements in the agriculture activity. A significant number of farmers have suggested that support for small ruminant businesses should be increased; that reduced costs for operating expenses of farmers should be applied; and that the constant change of policies related to animal husbandry negatively affects production.

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