

SHEEP PRODUCTION AND MARKETING IN AĞRI PROVINCE

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Abstract: *The aim of this study is to determine the factors that affect the production activities and marketing decisions of the sheep farming enterprises operating in the central villages of Ağrı Province. For this purpose, the questionnaire items were designed using a 5 point Likert-type scale and the questionnaire was administered to 169 farmers. Arithmetic means, frequencies and percentage distributions were used for the sociodemographic data to assess the data obtained from the questionnaires. The survey determined that 50.3% of the enterprises have 20-100 sheep, and 30.8% have 101-200 sheep. Factor analysis was used for the determination of factors that affect the selection of marketing channels. The correlation between 12 variables was divided into four factors using factor analysis. These factors were defined as farmer knowledge and flock size, trust in intermediaries and price, sales and relations, and preferences of other farmers-physical conditions.*

Keywords: Sheep farming, Marketing channel, Factor analysis.

JEL Classification Codes: Q1, Q13.

1. INTRODUCTION

Sheep raising is one of the important animal production activities in the world. This can be explained by the fact that pastures and meadows that are not used for other purposes can be used properly to raise sheep (Günaydın, 2009). Sheep turn the natural vegetation in pastures and meadows into foods such as meat and milk, which are basic elements of human nutrition. In addition to their contribution to human nutrition, sheep are also important for the production of the wool and leather used to make clothing (Emsen et al., 2008).

Sheep farming is also an important type of small livestock production. Sheep are highly adaptable. They feed in pastures and require minimal feed expenditures. They reproduce quickly. The duration of their feed conversion is short. Sheep require little capital and fixed investment expenditures. Foreign resources are largely unneeded. All these factors increase the importance of sheep farming (Günaydın, 2009).

The agriculture and livestock industry is a sector that maintains its importance for economic development in Turkey. Moreover, the livestock industry is the agricultural sub-sector with the highest total output. When the number of livestock was investigated, of the total livestock in Turkey, 25% consists of cattle, 56% consists of sheep, and 19% consists of goats (Turkish Statistical Institute, 2015). According to 2014 data from the Turkish Statistical Institute, bovines fell by 2%, and sheep and goats increased by 7.7% in comparison to the previous year.

At the end of 2014, the number of cattle was 14,123 million, the number of sheep was 31.115 million, and the number of goats was 10.347 million (Turkish Statistical Institute, 2015).

Livestock farming can be identified as a fundamental subsistence activity in Eastern Anatolia. Rather than crop farming, sheep farming has become one of the most important means of livelihood thanks to geographical conditions, climate conditions and geographical formations. These produce rich pastures and meadows on the Kars-Erzurum Plateau in the NUTS 2 Region (Kars, Ağrı, Ardahan and Iğdır). In the NUTS 2 Region, agricultural areas constitute 27.79% of the total acreage. Although, 57.6% of this agricultural area is irrigable, only 29.1% is already utilized (Serhat Development Agency, 2014).

After cattle farming, sheep and goat farming is one of the most important livestock activities in NUTS 2 Region. Sheep and goat farming is especially common where the altitude is low, and the climate is comparatively mild. In the region's provinces, the total number of sheep is 2,459,252. Ağrı Province has the highest number of sheep (57%). Iğdır Province is ranked second with 25.8%. Kars Province has a 15.7% share, and Ardahan Province has 1.84% of the sheep in the region.

The economy of Ağrı Province is mostly based on animal farming thanks to its animals and pasture areas. Ağrı Province has 4.33% of Turkey's current sheep population. Sheep production and activities are considered important for the economy of the city. Although the region's sheep population and pastures are appropriate for sheep farming, it is not a well-developed sector.

As well as production, marketing is also important matter for sheep farming activities. Therefore, sector-specific marketing decisions have critical importance in Ağrı Province. The aim of this study is to determine the factors that affect the sheep farming and marketing decisions of enterprises in the central villages of Ağrı Province.

2. EMPIRICAL FINDINGS

Data from 169 enterprises in the central villages of Ağrı Province constitute the basic data of the study. Data from Turkish Statistical Institute, relevant research and a variety of institutions and organizations were also used.

SPSS 17 was used to assess the data. Arithmetic means, frequencies and percentage distributions were used for the sociodemographic data. Factor analysis was used to determine the factors that affect the selection of marketing channels.

Of the farmers who participated, 33.7% are between the ages of 21 and 41, 54.4% are between the ages of 42 and 52, and 11.8% are 53 or older. Of them, 17.8% are illiterate, 63.3% are primary school graduates, and 18.9% are secondary school graduates. It was found that 54.4% of the farmers work year round at sheep farming. The total land size of the enterprises was calculated as 66.45 da on average. Of them, 79.2% do not use temporary labor. It was determined that 18% need temporary labor for 1-6 months, and 3% need temporary labor force for 7-12 months.

The enterprise population represents the available labor force for agricultural enterprises. In this study, the average population per enterprise is 5.72. Of the population, 57% are male, and 43% are female.

Enterprises with 20-100 sheep are most common at 50.3%. Enterprises with 101-200 sheep follow at the rate of 30.8%. Enterprises with 201 or more sheep were 18.9%. The rate of enterprises that have their own animals for breeding was the highest at 63.9%. Of the others, 28.4% obtain them from markets, 5.9% from neighbors, and 1.8% from breed stock producers.

Table 1. Sheep farming data

	% Yes	% No
Are you engaged in any other agricultural activity besides sheep farming?	55.0	45.0
Do you keep records of your sheep farming activities?	18.9	81.1
Are you a member of an agricultural union?	22.5	77.5
Have you ever received any education or course about sheep farming?	6.0	94.1
Do you add salt and mineral supplements to your animal feed?	73	27
Do you do supplemental feeding?	57.4	42.6
Vaccination status	96.4	3.6
Veterinary checkups	71.6	28.4

As Table 1 shows, 55% of the farmers are engaged in agricultural activities other than sheep farming, and 81.1% keep no records of their sheep farming activities. In another study conducted in Van, Karakuş et al. (2013) found that 61.95% keep no records of their sheep farming activities. The rate of Ağrı producers who have not received any education or training in sheep farming was 94%. Of them, 72.8% do not add salt and mineral supplements to their animal feed, and 57.4% do supplemental feeding. The rate of enterprises that have their animals checked on by veterinarians is 71.6%.

The distributions of farmers' reasons to be engaged in animal farming are shown in Table 2 Most (48.5%) belongs to reason that they farm animals to meet family needs. Another 32% said it contributed to their incomes, and 17.2% reported having no other source of income.

Table 2. Reasons to be engaged in animal farming

Reasons	Family needs	Habit	Contribution to livelihood	No other source of income	Total
%	48.5	2.4	32	17.1	100

Table 3 shows flock size and reasons for animal farming. Meeting family needs has the highest rate (48.8) for farmers with 20-100 sheep. This reason is lowest for producers with 201 and more sheep at 18.3%. Habit is the reason for animal farming for 50% for producers with 20-100 sheep. It seems likely that producers with 201 and more sheep consider animal farming a conscientious, professional activity, not a habit. In another study conducted in Southern Ethiopia Kocho et al.(2011), stated that smallholder farmers sale sheep and goats to fulfill immediate household cash needs, particularly to acquire food items.

Of the farmers with 201 or more sheep, 24.1% farm sheep because it contributes to their livelihoods. The rate of producers who prefer sheep farming because they have no other source of income was 72.4%.

Table 3. The proportional distribution of flock size and reasons for animal farming (%)

	20-100	101-200	201+	Total
Family needs	48.8	32.9	18.3	100.0
Habit	50.0	50.0	-	100.0
Contribution to livelihood	40.7	35.2	24.1	100.0
No other source of income	72.4	13.8	13.8	100.0

The distribution of the enterprises' feeding area rates were 56.5% for pasture, 24.5% for sheep fold and 18.5% for highlands.

Table 4. The proportional distribution of flock size and feeding area (%)

	20-100	101-200	201+	Total
Pasture	56.6	30.3	13.1	100.0
Sheep fold	25.7	42.9	31.4	100.0
Highlands	57.1	20.0	22.9	100.0

Table 5. The proportional distribution of flock size and method of sheep shearing (%)

	20-100	101-200	201+
Scissors	51.9	31.0	17.1
Machine	48.1	69.0	82.9
Total	100.0	100.0	100.0

Table 5 shows that the enterprises with 201 and more sheep shear their sheep using machines at the rate of 82.9%. The rates of shearing with scissors (31.0%) and machines (69.0%) were close for enterprises with 101-200 sheep.

Table 6. The proportional distribution of sheep product buyers (%)

	Not for sale	Cooperative	Merchant	Factory	Market	Other	Total
Milk	81.7	-	7.1	-	10.1	1.1	100.0
Meat	97	-	2.4	-	-	0.6	100.0
Cheese	72.8	0.6	5.9	0.6	16.0	4.1	100.0
Butter	85.8	-	1.2	-	12.4	0.6	100.0
Yogurt	92.3	-	2.4	-	5.3	-	100.0

Table 6 shows where sheep products are sold. An important rate of them are used for household consumption. Important rates of them are also sold in village markets.

Table 7. The proportional distribution of the enterprises' problems and expectations

Problems	(%)	Expectations	(%)
Market problem	44.4	Resolution of market problem	42.0
Education and health	27.8	No expectations	25.4
High animal feed prices	12.4	Resolution of pasture problem	17.2
Pasture problem	11.8	Resolution of breeding animal problem	7.1
Loan problem	2.4	Resolution of education and health problems	5.3
All of the above	1.2	Resolution of loan problem	3.0
Total	100.0		100.0

The proportional distribution of farmers' problems and expectations is shown in Table 7. It is seen that the market problem has the highest rate, 44.4%. Similarly, at (42%), the resolution of the market problem is also the farmers' most common expectation.

The proportional distribution of the factors that affect sheep sales is shown in Table 8. It shows that an available market, the number of sheep ready for sale and price expectations are the factors that affect sheep sales

Table 8. The proportional distribution of factors that affect sheep sales (%)

Factors that affect sheep sales	1	2	3	4	5	Total
Number of sheep ready for sell	0,6	1,2	-	11,8	86,4	100,00
Available market	-	0,6	-	11,8	87,6	100,00
Previous tendency	1,8	3,0	10,6	55,6	29,0	100,00
Price expectation	0,6	-	1,2	17,7	80,5	100,00
Bairam	-	0,6	1,7	31,4	66,3	100,00
Suggestions	3,0	3,6	18,3	47,3	27,8	100,00
Availability/Convenience	2,4	3,6	9,5	34,3	50,3	100,00
Space restrictions	3,0	4,7	7,1	31,4	53,8	100,00
Available feed source	0,6	0,6	-	21,3	77,5	100,00

Strongly Disagree: 1, Disagree: 2, Undecided: 3, Agree: 4, Strongly Agree: 5

Table 9 shows that 57.4% of the farmers disagree with the statement, I always update my production techniques. The rates of farmers who do and do not share the opinion that they minimize cost of input as much as possible were close at 34.9% and 36.7%, respectively. It was determined that 48.5% of the farmers do not focus on meat production. Of the farmers, 45% disagreed with the statement, "I have technical equipment and means for animal feeding that other farmers cannot get." Of them, 72.8% agreed to the statement, "I use special techniques (e.g., artificial insemination) to increase the quality of meat." The rate of farmers who said that they manage a complex business enterprise to minimize risk was 83.14%

Table 9. The proportional distribution of factors that affect production management (%)

Factors of production management	1	2	3	4	5	Total
I always update my production techniques.	10.1	57.4	14.8	14.2	3.5	100.00
I minimize the cost of input as much as possible.	17.2	36.7	9.5	34.9	1.7	100.00
I am engaged in activities focused on meat production.	11.2	48.5	9.5	28.4	2.4	100.00
I have technical equipment and means for animal feeding that other farmers cannot get.	17.2	45.0	8.9	26.6	2.3	100.00
I use special techniques (e.g., artificial insemination) to increase the quality of meat.	3.6	8.2	1.2	72.8	14.2	100.00
I manage a complex business enterprise to minimize risks.	-	1.8	-	14.8	83.14	100.00

Strongly Disagree: 1, Disagree: 2, Undecided: 3, Agree: 4, Strongly Agree: 5

Factor Analysis Results

Factor analysis of the factors that affect sheep sales

To determine the factors that affect sheep sales according to the results of face-to-face surveys with farmers in the central villages of Ağrı Province, questionnaires were administered to them. The questionnaires use a 5-point Likert scale (strongly disagree, disagree, undecided, agree, and strongly agree). The correlation between 9 variables was divided into 3 factors using factor analysis. Bartlett's sphericity test, which shows if data are related to each other, and the Kaiser-Mayer-Olkin (KMO) measure, which tests the adequacy of sample size for factor analysis, were used to measure the adequacy of the data set (Akgül and Çevik, 2005). The KMO measure was 0.781, meaning that factor analysis was appropriate. This value should be greater than 0.60 (Tabachnick and Fidell, 2001). As the KMO value approaches 1, it demonstrates that the data are appropriate for analysis, and when this value is 1, it shows that the sample size is very good. The significance level value of Bartlett's test was found to be 0.000. Since this value is lower than 5% tolerance, the H_0 hypothesis is rejected. In other words, Bartlett's sphericity test was found to be significant. In this case, there are high correlations between variables, and it means that the data have a multiple normal distribution. In other words, it is possible to state that the data set is appropriate for the factor analysis. In another study conducted in Middle-South Anatolia, Dağıstan et al. (2008), used factor analysis for sheep farming success activities. They found 7 factors and the variance percentage of these factors (company size, rant ability, food input, unit costs, land, labor productivity, pasturage time) is 82,892. Another study conducted Millian et al (2002) in their study they used to establish a typology, the data treated using a multivariate statistical analysis (principal component analysis) and a hierarchy analysis (cluster analysis) of the coordinates of the farms with the first five factors applied.

Whether the factors are significant was determined by determining if the eigenvalues of correlation matrix are greater than 1. Table 11 shows three factors that affect sheep sales. The variance explanation percentages of these factors generate the total explained variance, and the eigenvalues before and after the transformation, and they indicate that there are three factors.

Table 10. KMO Measure and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.781
Bartlett's Test of Sphericity	Approx. Chi-Square	607.403
	df	36
	Sig.	0.000

The first factor explains 32.014% of the total variance. The second factor explains 22.802%, and the third factor explains 17.379%. The cumulative variance explained by these eigenvalues explains 72.196% of the total variance. The factors that affect sheep sales were physical condition and experience, flock size and the status of market, and expectations and feed sources.

Table 11. The factor number and variance depending on eigenvalue statistics for the factors that affect sheep sales

Components	Initial Eigenvalues			The Rotation Sum of Squared Loads		
	Total Eigenvalue	Variance Proportion (%)	Cumulative Proportion of Variance (%)	Total Eigenvalue	Variance Proportion (%)	Cumulative Proportion of Variance (%)
1	3.713	41.256	41.256	2.881	32.014	32.014
2	1.635	18.166	59.421	2.052	22.802	54.816

3	1.150	12.774	72.196	1.564	17.379	72.196
4	0.671	7.453	79.648			
5	0.523	5.813	85.461			
6	0.428	4.753	90.214			
7	0.375	4.169	94.383			
8	0.284	3.156	97.540			
9	0.221	2.460	100.000			

The factors that affect market channel selection are shown in the Table 13. The KMO measure was calculated as 0.701, and because the significance of test was crucial according to it, carrying out factor analysis was considered appropriate.

For the factors that affect market channel decisions, the correlation between 12 variables were divided into 4 factors using factor analysis. The factors and sub-factors are shown in Table 14.

Table 12. The rotated factor loads for the factors that affect sheep sales (rotated component matrix)

	1	2	3
Factor 1: Physical condition and experience			
Recommendation	0.811		
Shipping status	0.784		
Space restrictions	0.741		
Availability/convenience	0.729		
Previous practices	0.684		
Factor 2: Flock size and the status of market			
The number of sheep ready for sale		0.905	
Available market		0.877	
Factor 3: Expectation and feed sources			
Price expectations			0.766
Available feed sources			0.591

These four factors were farmer knowledge and flock size, trust in intermediaries and price, sales and relations and the preferences of other farmers and physical conditions (Table 15). Factor 1 constitutes 18.880% of the variance, and factor 2 constitutes 18.879%. Factor 3 constitutes 14.784%, and Factor 4 constitutes 14.352%. The analysis determined that these factors explained 66.894% of the total variance. Tsourgiannis et al. found that in their study many farm and farmers' characteristics such as the size of the flock, volume of milk production, farm income, debt, found to affect the distribution channel choice. And they described that the factors including sales price, speed of payment, loyalty also have a significant influence on a marketing outlet selection.

Table 13. The KMO measure and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.701
Bartlett's Test of Sphericity	Approximate Chi-square	658.326
	df	66
	Significance	0.000

Most of the enterprises that are engaged in sheep production in the central villages of Ağrı Province are small and medium-sized enterprises doing conventional production. Of the farmers, 33.7% are

between the ages of 21 and 41, 54.4% are between the ages of 42 and 52, 11.8% are 53 or older. Of them, 17.8% are illiterate, 63.3% are primary school graduates, and 18.9% are secondary school graduates. The average population per enterprise is 5.72, and of the population, 57% are male, and 43% are female.

Enterprises with 20-100 sheep are most common, 50.3%. Enterprises with 101-200 sheep follow this at the rate of 30.8%.

Table 14. The Factor Number and Variance depending on the Eigenvalue Statistics for the factors that affect marketing channel selection

Components	Initial Eigenvalue			The Rotation Sum of Squared Loads		
	Total Eigenvalue	Variance Proportion (%)	Cumulative Proportion of Variance (%)	Total Eigenvalue	Variance Rate (%)	Cumulative Proportion of Variance (%)
1	3.753	31.271	31.271	2.266	18.880	18.880
2	2.000	16.664	47.935	2.265	18.879	37.759
3	1.192	9.935	57.871	1.774	14.784	52.543
4	1.083	9.024	66.894	1.722	14.352	66.894
5	0.806	6.713	73.608			
6	0.729	6.075	79.683			
7	0.663	5.527	85.209			
8	0.514	4.282	89.491			
9	0.406	3.386	92.878			
10	0.340	2.836	95.714			
11	0.270	2.247	97.961			
12	0.245	2.039	100.000			

Table 15. The rotated factor loads for the factors that affect marketing channel selection (rotated component matrix)

	1	2	3	4
Factor 1: Farmer knowledge and flock size				
Farmer's trying different marketing channels	0.828			
The low number of sheep	0.737			
Farmer's interest for live weight on sale	0.702			
Factor 2: Trust in intermediaries and price				
Loyalty		0.860		
Payment rate		0.843		
Sale price		0.775		
Factor 3: Sales and relations				
The amount of sheep bought			0.745	
Personal relations			0.630	
Farmers sell sheep late			0.628	
Factor 4: Preferences of other farmers and physical conditions				
Many farmers' selecting the same market channel				0.778
Wholesalers				0.747
Insufficient space to shelter sheep				0.535

3. CONCLUSIONS

In the study, the factors that affect sheep sales were divided into 3 factors. These factors were physical condition and experience, flock size and market status, and expectations and feed sources. The total number of factors that affect market channel selection was reduced from 12 to 4. These factors were farmer knowledge and flock size, trust in intermediaries and price, sales and relations and the preferences of other farmers and physical conditions. Factor 1 constitutes 18.880% of the variance. Factor 2 constitutes 18.879%. Factor 3 constitutes 14.784%, and factor 4 constitutes 14.352%. Analysis determined that these factors explained 66.894% of the total variance.

It was determined that the most important problem of the sheep production enterprises is the market, and expectations of the market ranked highest among the farmers' expectations.

It is suggested that sheep marketing systems, integrated intervention of the market channels along the value chains and market actors, and co-operatives could improve marketing efficiency and profitability of sheep marketing system.

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