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## Technical-economic analysis of sheep and goat herds in Romania

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# TECHNICAL-ECONOMIC ANALYSIS OF SHEEP AND GOAT HERDS IN ROMANIA

IRINA-ADRIANA CHIURCIU<sup>1</sup>, ELENA COFAS<sup>2</sup>

**Summary:** *The paper aims to identify the number of sheep and goats existing in Romania, spread over Macroregions, Development Regions and counties and to present its evolution in the period 2014-2019. At the same time, a comparison will be made with the situation registered in 1990. The favorable conditions for raising sheep and goats have placed Romania on the 3rd place in the European Union in terms of their number. In 2019, the number of sheep meant 10,358,699 heads, and those of goats 1,594,862 heads. These values increased compared to 2014 by 8.83% for sheep and 12.54% for goats. At the level of Macroregions, most sheep were found in Macroregion One - 4,095,872 heads, representing 40% of the total, and in Macroregion Two, most heads of goats - 664,473 heads, representing 42% of the total, valid values for the year 2019. The development regions where most animals were registered were N-W Region - 2,285,787 for sheep and S-E Region 425,834 for goats. It should also be mentioned that Timiș County - 612,638 sheep heads and Constanța County - 140,559 goat heads, were on the first places at NUTS 3 level, in the breeders' ranking. All these results conclude that in Romania the high growth potential of sheep and goats is not exploited, an occupation that could represent an advantage for the relaunch of the livestock sector.*

**Keywords:** *goats, herds, livestock, sheep, Romania*

**JEL Classification:** *Q10*

## INTRODUCTION

Due to the advantageous geographical position of our country, the varied relief and the large areas of pastures (3.3 million ha) and meadows (1.5 million ha), which represent 14% and respectively 7% of the total of 14.6 million ha of land, raising sheep and goats is an activity practiced in Romania since ancient times. These animals are well adapted to the climatic conditions in Romania and are raised on small subsistence and semi-subsistence farms, requiring low maintenance costs [7]. The average size of a farm is small (29 heads of sheep / farm and 11 heads of goat / farm) which makes it more difficult to adapt to high-performance technologies due to lack of own funds and reduced access to other sources of funding [3].

Although it is not the most productive domestic animal, the sheep is the animal with the most goods produced (wool, meat, milk, skin, etc.). The purpose for which it is raised in Romania is usually milk production and to a lesser extent meat production [4]. In European Union countries, the most important product is meat [9]. The development of the livestock sector and mainly of the sheep sector would give breeders the opportunity to export sheep meat, which could lead to high incomes.

Starting from the values recorded in 1990, the paper analyzes the existing situation in the sheep and goat sector in Romania, thus identifying the Macroregions, Development Regions and counties where the most specimens of the mentioned species are found.

## MATERIAL AND METHODS

For the elaboration of this paper were used the information available online on the website of the National Institute of Statistics, more precisely the Tempo-Online database and on the EUROSTAT website (European Statistical Office), the online database of the European Union. This information was processed using a quantitative analysis method and presented in the form of tables or graphs. In parallel, the specialty literature was studied, in order to know the current state of the information on the approached topic. The analyzed period is 2014-2019, and the purpose of this

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study was the analysis of sheep and goats, in the context of support provided to this sector by the Ministry of Agriculture and Rural Development, through various programs and campaigns.

## RESULTS AND DISCUSSIONS

As Soare E., 2016 notes, the sector of activity dealing with sheep and goat farming can be approached from 3 different positions: economic, social and ecological [10].

The benefits of raising sheep and goats in rural areas can be seen not only in the market, bringing income, but also in local households, where products obtained from these animals are used. We can complement the socio-economic role that these species have in terms of employment in rural areas and the contribution to improving environmental conditions and preserving biodiversity [3]. Thus, sheep and goats can graze on land unsuitable for other crops, land in marginal areas or in areas with natural or specific constraints, and the manure of these animals is a possibility to enrich soil fertility [8].

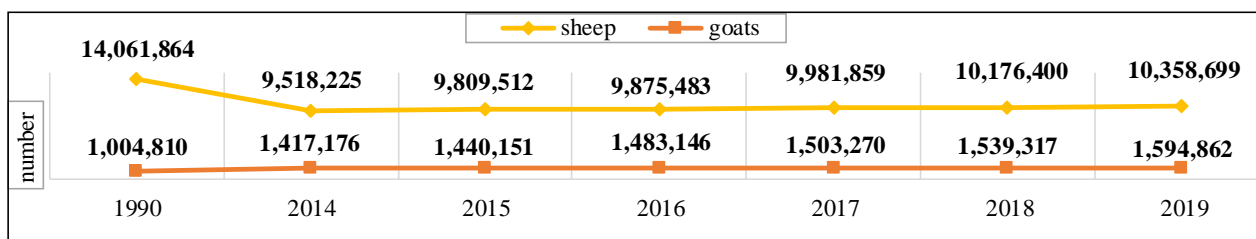
At the same time, by supporting the continuity of their growth in the areas where this activity has been practiced in the past, biodiversity is maintained and traditional customs are passed on.

Figure 1 shows the evolution of the number of sheep and goat heads in Romania in 1990 and in the period 2014-2019.

For sheep it is observed a numerical decrease in 2014 compared to 1990. The decrease is of 32.31%. By contrast, for the period 2014-2019 there is an increase in sheep flocks of 8.83% more in 2019 than in 2014.

Goats registered increases, both in 2014, compared to 1990, of 41.04%, and in 2019 compared to 2014, of 12.54%.

Figure 1. Total number of sheep and goats in Romania



Source: own interpretation, according to [5]

An explanation for the increase in livestock of the two categories of animals is also the non-refundable funds granted by the 2014-2020 NRDP [1], such as and the interest in exporting to Arab countries. Also, "The campaign to inform and promote the consumption of sheep meat - Choose the Sheep/ Alege oaia!" contributed to the orientation of farmers towards this zootechnical sector [6].

Table 1 shows the evolution of sheep heads on Macroregions and Development Regions in the period 2014-2019, as well as the values that were recorded in 1990. It can be observed that if in 1990 in Macroregion Two the most sheep were encountered - 5,139,700, in 2019 the first place was occupied by Macroregion One, with 4,095,872 sheep heads. Macroregion Three held the last place both in 1990 and 2019, with 2,065,400 sheep heads and 1,030,837 respectively.

Compared to 1990, in 2019 only Macroregion One had an additional 226,072 sheep, but for the other three macroregions there were observed decreases in the number of heads. For Macroregion Two we recorded the largest decrease, with 2,138,907 sheep.

Reporting to 2014, for all macroregions we have seen increases, in 2019, for the analyzed indicator. The largest increase was in Macroregion Three, of 12.68%, followed by Macroregion One, 10.52%, and on the last place Macroregion Two - 6.83%. For the Development Regions, it is obvious the decrease of the number of sheep by 11.77% in the Bucharest-Ilfov Region and the most

significant increases, found in the South-Muntenia Region - 13.53% and the North-West Region - 12.40%. The North-East region had the smallest growth, of 2.80%.

Table 1. Total sheep on Macroregions and Development Regions

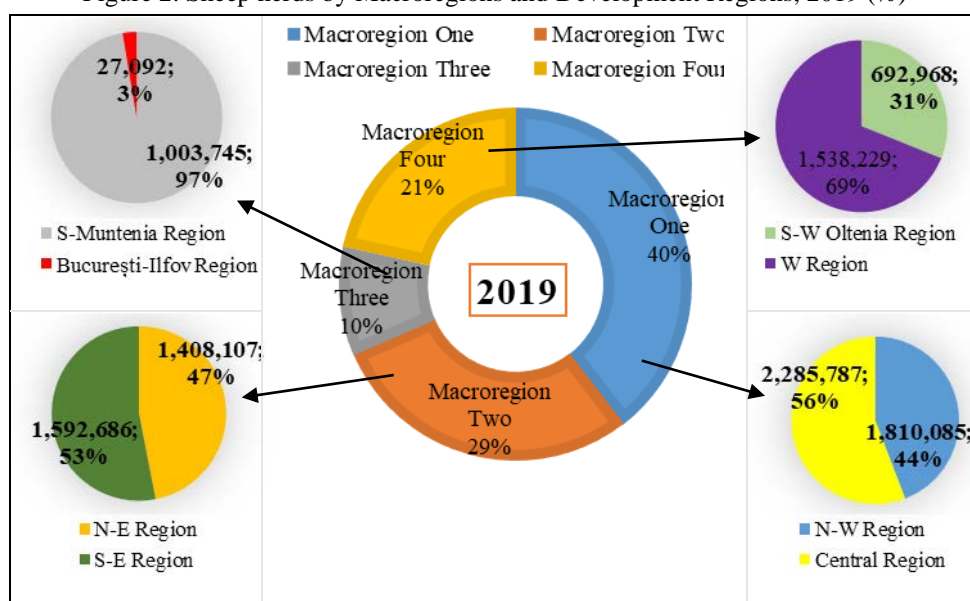
Specification	1990	2014	2015	2016	2017	2018	2019	2019/2014 %
MACROREGION ONE	3,869,800	3,706,046	3,767,239	3,820,778	3,971,515	4,025,941	4,095,872	110.52
NORTH-WEST Region	1,985,500	1,610,376	1,649,303	1,668,922	1,679,514	1,709,860	1,810,085	112.40
CENTER Region	1,884,300	2,095,670	2,117,936	2,151,856	2,292,001	2,316,081	2,285,787	109.07
MACROREGION TWO	5,139,700	2,808,989	2,904,482	2,888,275	2,889,994	2,968,482	3,000,793	106.83
NORTH-EAST Region	2,691,000	1,369,698	1,395,954	1,403,177	1,395,832	1,431,147	1,408,107	102.80
SOUTH-EAST Region	2,448,700	1,439,291	1,508,528	1,485,098	1,494,162	1,537,335	1,592,686	110.66
MACROREGION THREE	2,065,400	914,819	965,906	965,201	990,169	998,320	1,030,837	112.68
Region SOUTH-MUNTENIA	1,990,800	884,112	935,565	933,987	959,886	974,041	1,003,745	113.53
Region BUCHAREST-ILFOV	74,600	30,707	30,341	31,214	30,283	24,279	27,092	88.23
MACROREGION FOUR	2,987,000	2,088,371	2,171,885	2,201,229	2,130,181	2,183,657	2,231,197	106.84
SOUTH-WEST OLTENIA Region	1,417,100	657,169	679,271	685,812	668,522	686,596	692,968	105.45
WEST Region	1,569,900	1,431,202	1,492,614	1,515,417	1,461,659	1,497,061	1,538,229	107.48

Source: own calculations, according to [5]

Analyzing the spread of sheep on Macroregions and Development Regions for 2019 (Figure 2), it is found that most heads were found in Macroregion One 40% - 4,095,872 and in Macroregion Two 29% - 3,000,793. Other values obtained were: Macroregion Four - 21% and Macroregion Three - 10% of the total sheep raised in 2019.

The top for large sheep breeders at the level of Development Regions was as follows: N-W Region 2,285,787 sheep, representing 56% of the total of Macroregion One; Central Region 1,810,085 sheep, representing 44% of the total of Macroregion One; S-E Region 1,592,686 sheep, representing 53% of the total of Macroregion Two and W Region 1,538,229 sheep, representing 69% of the total of Macroregion Four. On the last place was Bucharest-Ilfov Region - 27,092 sheep (3% of the total of Macroregion Three).

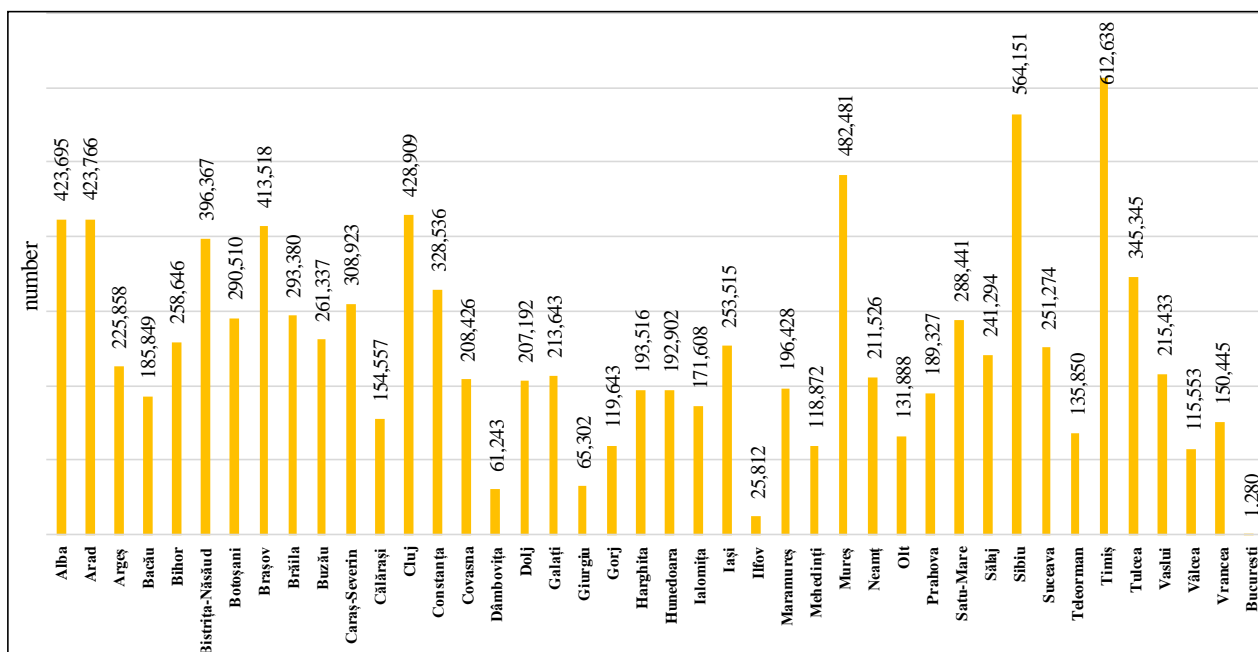
Figure 2. Sheep herds by Macroregions and Development Regions, 2019 (%)



Source: own interpretation, according to [5]

At the level of NUTS III (Figure 3), the situation was as follows, compared to 2019: most sheep were raised in Timiș County - 612,638 heads, followed by Sibiu County - 564,151 heads, Mureș County - 482,481 heads. Other counties that registered over 400,000 sheep were Cluj - 428,909 heads, Arad - 423,766 heads, Alba - 423,695 heads and Brașov - 413,518 heads. Apart from the area of Bucharest, which owned 1,280 sheep, other counties that had less than 100,000 animals of the mentioned species were: Ilfov - 25,812 heads, Dâmbovița - 61,243 heads and Giurgiu - 65,302 heads. From the data presented by NIS [5] we noticed that the area occupied by pastures and perennial fodder in the counties with the lowest number of sheep is much smaller compared to the areas occupied with the same crops, in the counties that had the highest number of sheep. It should also be specified that Dâmbovița, Ilfov and Giurgiu counties are located in the southern part of the country, where the effects of water scarcity are more pronounced, and the proximity to the Bucharest metropolitan area limits the existence of grazing places for animals.

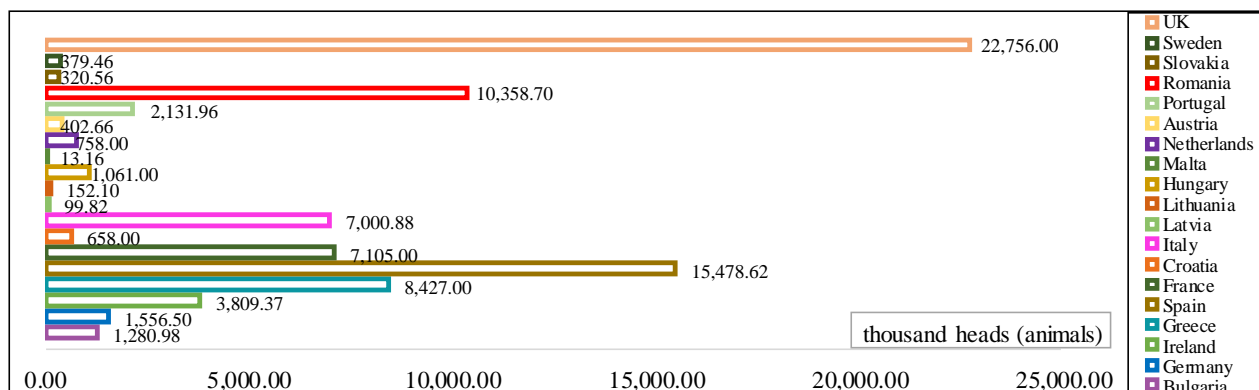
Figure 3. Sheep herds by counties, 2019



Source: own interpretation, according to [5]

According to Eurostat, in 2019, sheep were raised only in 19 states out of the 28 EU members. The main sheep breeders in the European Union were UK - 22,756 thousand heads, Spain - 15,478.62 thousand heads and Romania - 10,358.70 thousand heads (Figure 4). Lithuania (152.10 thousand heads), Latvia (99.82 thousand heads) and Malta (13.16 thousand heads) were on the last places in this ranking.

Figure 4. The main sheep breeders in the EU, 2019



Source: own interpretation, according to [2]

Table 2 mentions data regarding the evolution of goat herds on Macroregions and Development Regions, in the period 2014-2019 and at the same time indicates the values that were recorded in 1990. It can be observed that if in 1990 in Macroregion Four the most goats were encountered - 346,758, in 2019 the first place was occupied by Macroregion Two, with 664,473 goat heads. Macroregion One held both in 1990 as well as in 2019 the last place, with 178,566 goat heads and 248,392 respectively.

Compared to 1990, in 2019 all four macro-regions recorded increases in the number of heads. The largest increase was in Macroregion Two, with 390,465 goats.

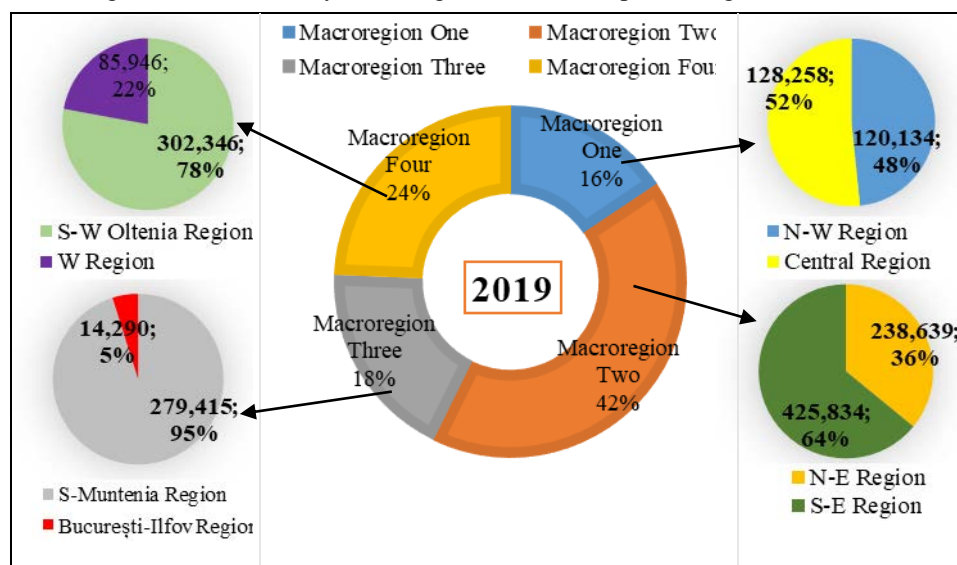
Reporting to 2014, for all macroregions we have seen increases, in 2019, for the analyzed indicator. The highest value was registered by Macroregion Four, of 14.88%, followed by Macroregion Two, 13.71%, and on the last place was Macroregion One - 7.95%. The growth of the number of goats was also found in the Development Regions, so we noted the most important increases for the West Region - 27.76%, the South-East Region - 17.74% and the North-East Region - 14.37%. The Center Region had the lowest increase, of 2.55%.

Table 2. Total goats on Macroregions and Development Regions

Specification	1990	2014	2015	2016	2017	2018	2019	2019/2014 %
MACROREGION ONE	178,566	230,109	237,966	247,484	254,468	259,690	248,392	107.95
NORTH-WEST Region	92,270	105,040	107,415	112,777	115,258	118,005	120,134	114.37
CENTER Region	86,296	125,069	130,551	134,707	139,210	141,685	128,258	102.55
MACROREGION TWO	274,008	584,387	592,053	601,628	608,639	626,100	664,473	113.71
NORTH-EAST Region	94,607	222,704	224,245	229,838	230,848	235,687	238,639	107.16
SOUTH-EAST Region	179,401	361,683	367,808	371,790	377,791	390,413	425,834	117.74
MACROREGION THREE	205,478	264,693	268,965	274,188	274,814	282,334	293,705	110.96
Region SOUTH-MUNTENIA	200,547	251,816	256,864	260,633	261,276	270,021	279,415	110.96
Region BUCHAREST- ILFOV	4,931	12,877	12,101	13,555	13,538	12,313	14,290	110.97
MACROREGION FOUR	346,758	337,987	341,167	359,846	365,349	371,193	388,292	114.88
SOUTH-WEST OLTENIA Region	261,187	270,713	270,292	283,558	286,353	289,235	302,346	111.69
WEST Region	85,571	67,274	70,875	76,288	78,996	81,958	85,946	127.76

Source: own calculations, according to [5]

Figure 5. Goat herds by Macroregions and Development Regions, 2019 (%)



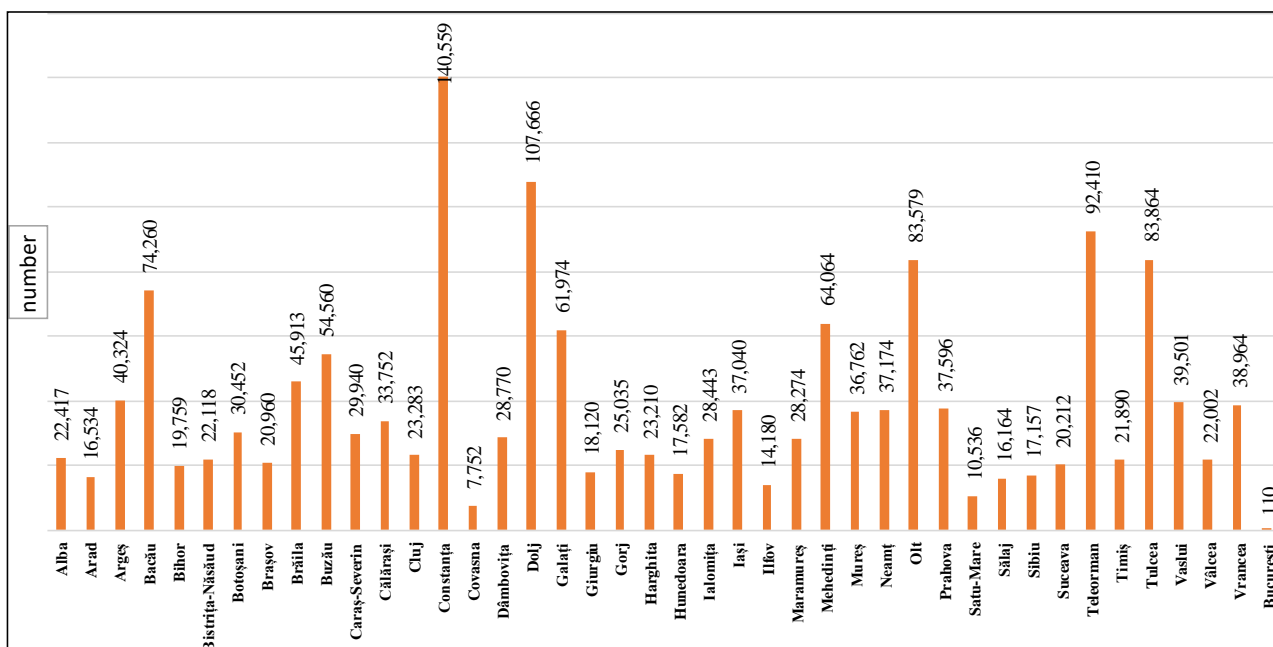
Source: own interpretation, according [5]

Analyzing the distribution of goats by Macroregions and Development Regions for 2019 (Figure 5), it is found that most heads were found in Macroregion Two 42% - 664,473 and in Macroregion Four 24% - 388,292. Other values obtained were: Macroregion Three - 18% and Macroregion One - 16% of the total goats raised in 2019.

The top for the large goat breeders at the level of Development Regions was the following: S-E Region 425,834, representing 64% of the total of Macroregion Two; S-W Oltenia Region 302,346, representing 78% of the total of the Four Macroregion; S-Muntenia Region 279,415, representing 95% of the total of Macroregion Three and N-E Region 238,639, representing 36% of the total of Macroregion Two. On the last place was Bucharest-Ilfov Region - 14,290 (5% of the total of Macroregion Three).

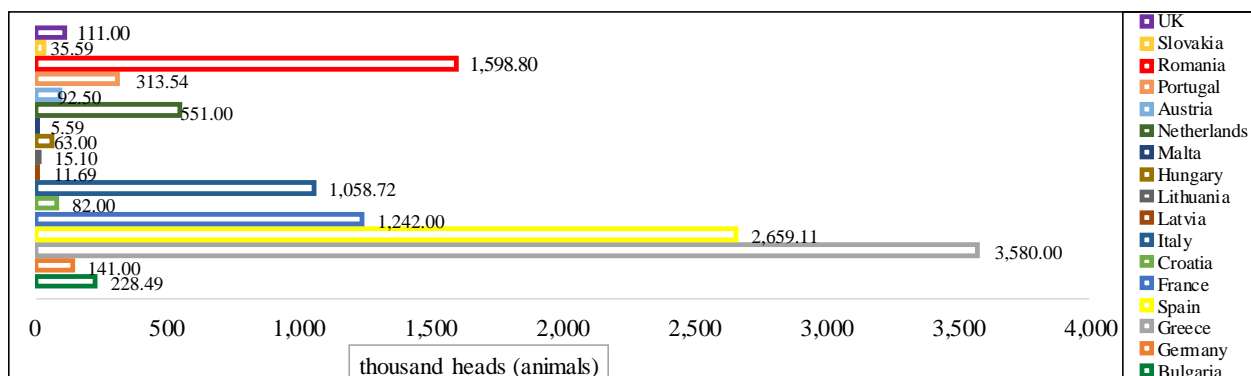
At the level of NUTS III (Figure 6), the situation was as follows, compared to 2019: most goats were raised in Constanța County - 140,559 heads, followed by Dolj County - 107,666 heads. The other counties registered values below 100,000 goats, of which we mention: Teleorman - 92,410 heads, Tulcea - 83,864 heads, Olt - 83,579 heads and Bacău - 74,260 heads. Apart from the area of Bucharest, which owned 110 goats, other counties that had less than 20,000 animals of the mentioned species were: Ilfov - 14,180 heads, Satu-Mare - 10,536 heads and Covasna - 7,752 heads.

Figure 6. Goat herds by counties, 2019



Source: own interpretation, according to [5]

Figure 7. The main goat breeders in the EU, 2019



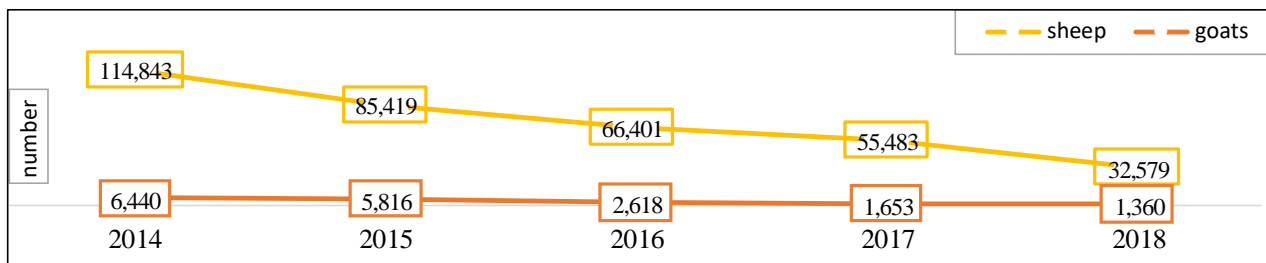
Source: own interpretation, according to [2]

According to Eurostat [2], in 2019, goats were raised only in 17 states out of the 28 EU members. The main goat breeders in the European Union were Greece - 3,580 thousand heads, Spain - 2,659.11 thousand heads and Romania - 1,598 thousand heads (Figure 7). As in the case of sheep, Lithuania (15.10 thousand heads), Latvia (11.69 thousand heads) and Malta (5.59 thousand heads) were on the last places in the ranking of goat breeders.

The raising of sheep and goats in an ecological regime has been successfully practiced recently, in the member countries of the European Union. For sheep, the main breeders that followed this breeding technology in 2018 were Greece - 1,299,677 heads, France - 1,132,809 heads and UK - 826,598. For Romania, out of the total number of sheep (10,176,400 heads in 2018), those raised in ecological regime represented 0.32%.

Greece - 494,031 heads, Italy - 110,055 and France - 109,938 were the main organic goat breeders. Although Romania was on the third place in terms of the total number of goats, organically raised animals totaled 1,360 heads in 2018, which placed our country on the last places in the Union. Out of the total number of goats (1,539,317 heads in 2018), those raised in ecological regime represented 0.09%.

Figure 8. The number of sheep and goats raised in ecological regime in Romania, 2018



Source: own interpretation, according to [2]

Analyzing Figure 8, it is found that the number of sheep and goats that were raised in the ecological regime, in the period 2014-2018, in Romania, decreased for both categories of animals, by 71.63% for sheep and by 78.88% for goats.

What recommends the consumption of mutton? The fact that it is a healthy food, containing proteins that can be easily absorbed by the body and very important, in spring this meat is the lowest in fat and the most tender. Also, the risk of antibiotic residue poisoning is lower in these animals [4].

Following this analysis and taking into account the fact that the European Union-28 provided from its own production only 88% of the demand for sheep and goat meat [11], supporting this livestock sector in Romania, a country with a tradition in raising these animals, would create new opportunities for farmers.

## CONCLUSIONS

Romania has a natural environment conducive to the development of the livestock sector, but in our country the consumption of sheep and goat meat is seasonal, especially in spring, on the occasion of the Easter holidays and in autumn, on the "Harvest Days". As a result, Romania exports more than it consumes. The intensification of exports to non-EU countries, recently notified, can bring benefits to Romanian farmers. That is why this sector has been included in MADR's priority list since 2017, and the results of these efforts have started to be noted in the livestock growth.

The quality, benefits and diversity of products obtained from sheep and goats, the lower production costs resulting on these farms compared to other livestock farms, and the secular traditions related to their growth are advantages that can influence the preferences of livestock farmers. The increase in sheep and goat farms would cover domestic demand and bring important benefits for Romanian farmers through exports.



## ACKNOWLEDGEMENTS

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