

FARM STRUCTURE IN ANIMAL SECTOR OF ROMANIA

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Abstract

The paper aimed to analyze the number of animal holdings, their structure by species and size class and also the average farm size based on the data provided by Eurostat and National Institute of Statistics. Fixed and structural indices as well as comparisons were the main statistical tools to assess the results. Romania has a high number of animal farms being on the top position in the EU, but the smallest farm size. The decline of bovine, swine and poultry livestock has relatively contributed to the growth of farm size and production efficiency. About 72.7% of agricultural holdings have land and animals and 23.3% rear only animals. Individual holdings are dominant and keep 86.9% bovine farms, 53% pig farms, 93.3% sheep farms, 95.1% goats farms and 67.4% poultry farms. Commercial holdings represent 44.4% of pig farms and 31.7% of poultry farms de very small percentages in case of the other species. At the national level, the average farm size of animal farms is: 3.4 bovines, 2.4 dairy cows, 3.2 pigs, 43.7 sheep, 10.6 goats and 31.6 poultry. A smaller average farm size is in the individual holdings: 2.9 bovines, 2.2 dairy cows, 1.7 pigs, 41.3 sheep, 10.1 goats and 18.7 poultry. Commercial companies have in average a higher average size: 211 bovines, 97.8 dairy cows, 7,878 pigs, 942.6 sheep, 181.7 goats and 96,009.2 poultry. The gap between individual and commercial holdings is difficult to be reduced, as long as farm concentration is a slow process. The decline in livestock, farmers aging and the new modern farms established with EU financial support are expecting to contribute to the improvement of farm structures in animal sector.

Key words: animal sector, farms structure, average farm size, individual households, commercial companies, Romania

INTRODUCTION

Agriculture is an important sector of the economy in any country as it provides food for population, raw materials for various processing industries, jobs and income for the rural population. Combining in its own way the three production factors: land, labor and capital, cultivating agricultural crops and rearing animals, using various technologies, part of them friendly with the environment, selling its products on the market, it also contributes to the increase of gross domestic product, gross value added, and trade intensification, to the improvement of living standard and environment protection.

Therefore, agriculture creates a bridge of interconnections between economic, social and environment factors destined to contribute to the sustainable development [31, 39, 47, 49].

The role of agriculture is carried out by farms and farmers called to transform the inputs into high value products and goods for keeping life and satisfying much better humans' needs.

Agricultural production is running in farms of different profile, size, technical endowment, material and financial resources, labor qualification, technologies applied, and also in various geographical areas, soil and climate conditions and facing more and more with the challenges produced by climate change [54].

Productivity and efficiency in agriculture is closely related to farm structure. The EU agriculture has a large diversity of farm structures with a deep influence on land concentration, and despite that this is a slow process, the last 15 years the number of agricultural holdings has been reduced in favor of average farm size [6, 7, 16, 18].

The high number of agricultural holdings, most of them being small scale farms, and the domination of family farming are the main features of the EU agriculture and especially in the CEEs countries [1, 3, 14, 55].

Therefore, many small farmers have to sustain their business trying to continuously respond to market requirements, to adapt technologies and improve product chain from farm to fork looking for solutions to enable them to pass from subsistence and semi-subsistence to commercial farming [15, 32].

In 2016, of the EU-28 agricultural holdings accounting for 10.5 million, 90% belonged to family farming, which proved to play a crucial role in assuring employment, income and living standard for rural population [13].

Romania occupies a special position in the EU agriculture as it joined EU in 2007 with a high number of farms, with a deep fragmentation of land into small plots, most of farms being of a subsistence and semi-subsistence type, with many old fashioned farmers accustomed to work land and raise animals in a traditional way, having an obsolete endowment, low productivity and efficiency and family farming being dominant [20].

Animal sector has diminished its importance in agricultural production value due to the decline of bovine, swine and poultry livestock, and in 2020 it contributed with about 30% in the agricultural production value as mentioned by National Institute of Statistics.

In Romania the number of animal farms is high and of a diverse size, mainly of small scale, the farmers fight to survive and cover the market needs, but the deficit between supply and demand has led to the increase of imports of various food of animal origin, mainly from the EU countries [47].

In Romania just a few studies provides results regarding the farm structure in animal sector [17, 19, 27].

In this context, the purpose of the paper was to analyze the structure of agricultural holdings raising animals in Romania by species, and size class in terms of animals. Also, another purpose is to determine the average farm size expressed in number of animals per farm and to make a comparison between the average farm size in the individual households which are dominant and the average farm size in the commercial companies with majority private capital.

MATERIALS AND METHODS

The data were taken from Eurostat and also from National Institute of Statistics data bases regarding the last farm survey achieved in 2016, which is the only available source of data till present as the next farm survey is planned by the EU to be done in 2023.

The main indicators analyzed in this research are the following ones:

- number of agricultural holdings raising animals;
- number of livestock by species, taking into account only the main species: bovines, swine, sheep, goats and poultry;
- number of individual holdings raising animals;
- number of livestock raised by individual holdings;
- number of commercial companies raising animals;
- number of livestock grown by commercial companies;
- average farm size by species and average farms size by species and size class for all the agricultural holdings;
- average farm size by species in individual holdings and average farms size by species and size class for individual agricultural holdings;
- average farm size by species in commercial companies with majority private capital and average farms size by species and size class for commercial companies.

The data were processed using especially fixed indices, structural indices and

comparisons between the average farm size in the individual agricultural holdings and commercial companies.

The results of the calculations regarding farm structure for various criteria of analysis were tabled and interpreted and allowed to draw the corresponding conclusions!

RESULTS AND DISCUSSIONS

Romania -top position in the EU for the number of agricultural holdings

Romania is in the top regarding the number of farms in the EU. In 2016, it had 3.42 million agricultural holdings, representing 32.6% of the EU farms.

Romania is followed by Poland (13.4%), Italy (10.9%), Spain (9%), Greece (6.5%), France (4.3%), Hungary (4%), Germany 2.6%, Portugal 2.4% and Bulgaria (1.9%) [11].

In the period 2005-2016, the EU number of holdings declined by 25%, meaning a loss of 4.2 million farms, about 85% of them being small farms having less than 5 ha. In the same period of time, Romania lost -20% farms, being on the 2nd position after Poland (- 43%) and being followed by Italy (-34%).

Animal farms in the EU are very important for providing food of animal origin and raw materials for processing industry. In the EU the ratio vegetal/animal sector is relatively balanced as 49% of farms are dealing with crop culture, 35% farms are specialized in animal farming and 16% are mixed holdings [12].

The main EU member states with the highest number of animal holdings are: Romania, Poland, Hungary, France, Greece, Spain, Germany, Portugal, Italy and Bulgaria (Table 1).

Table 1. The top EU countries raising animals in 2016

	No of agricultural holdings	Of which, farms with livestock	Share of animal farms in total agricultural holdings (%)
1.Romania	3,433,030	2,567,430	75
2.Poland	1,410,700	718,240	50.9
3.Hungary	430,000	261,540	60.8
4.France	456,520	247,570	54.2
5.Greece	684,950	238,520	34.8
6.Spain	945,020	216,700	22.9
7.Germany	276,120	184,690	66.8
8.Portugal	258,980	172,350	66.5
9.Italy	1,145,710	154,680	13.5
10.Bulgaria	202,720	134,970	66.5%

Source: Own calculation based on Eurostat, 2017 [10].

In 2016, Romania had 39% crop farms, 25% animal farms and 36% mixed farms.

Animal output and its contribution to agricultural output in Romania

Animal sector plays an important role in Romania's agriculture and gives its

contribution to agricultural output. In 2020, animal output accounted for Euro 3,258 million representing 27.7% of agricultural output of Romania and also 2.6% of the EU agricultural output as mentioned by Eurostat (Table 2).

Table 2. Dynamics of animal output and its share in agricultural output, Romania, 2016-2020 (Euro million)

	2016	2017	2018	2019	2020	2020/2016%
Agricultural output	12,356	13,622	14,039	13,612	11,752	95.11
Animal output	3,375	3,509	3,134	3,107	3,258	96.53
Share (%)	27.3	25.7	22.3	22.8	27.7	-

Source: Own calculation based on Eurostat Fact Sheet Romania, 2019 and 2021 [8, 9].

However, both agricultural output and animal output registered a descending trend in the

period 2016-2020 due to the decline in livestock (bovines, pigs, poultry), except

sheep and goats, and also due to climate change which affected crop and fodder production and other factors.

In 2020, in total animal output, animals accounted for Euro 1,600 million (49.1%), the main contributors being pigs, cattle, poultry and sheep and goats, and animal products mainly regarding milk and eggs, accounting for Euro 1,658 million (50.9%) (Table 3).

In the period 2016-2020, the share of animal output increased by +1.3 pp from 47.8% in 2016 to 49.1% in 2020, while the share of animal products declined by -1.3 pp from 52.2% to 50.9%.

In 2020, the highest weight in animal products belonged to milk (25.3%), pigs (22.6%), eggs (15.7%), and also to poultry (12.8%) and cattle (8.5%).

Table 3. Structure of animal output by sources, Romania, 2016-2020 (%)

	2016	2017	2018	2019	2020	2020/2016 %
Animal output (Euro million)	3,375	3,509	3,134	3,107	3,258	96.53
Contribution of animals and animal products to animal output (%; pp)						
Animals	47.8	47.5	46.9	48.5	49.1	+1.3
-Cattle	8.7	7.2	7.2	6.8	8.5	-0.2
-Pigs	20.9	23.1	21.9	22.8	22.6	+1.7
-Sheep and goats	5.0	4.7	5.1	5.3	4.9	-0.1
-Poultry	12.7	11.7	12.4	12.8	12.8	+0.1
Animal products	52.2	52.2	53.1	51.5	50.9	-1.3
-Milk	26.4	26.6	24.5	24.4	25.3	-1.1
-Eggs	17.7	17.1	13.6	17.7	15.7	-2.1
Other products	8.0	8.8	9.9	9.3	9.9	+1.9

Source: Own calculation based on Eurostat Fact Sheet Romania, 2019 and 2021 [8, 9].

Cattle, especially dairy cows and buffalos bring their major contribution accounting for about 97% of milk production, and sheep and goats to the rest of about 3%. They play an important role in assuring farmers family consumption, but also for providing raw milk to dairies [36, 37, 45]. However, milk market needs are not covered by internal production, and imports of dairy products are justified [44, 46, 53].

Dairy farming is facing the decline of the number of dairy cows, low yield, insufficient forages due to the long droughts of the last years, milk quality problems as only the commercial farms have milking parlors, low average milk price at delivery to dairies, therefore it is a real milk crisis in Romania [38, 41, 46].

However, goat milk is more required grace to its special quality, and for being processed into cheese, that is why goat livestock is increasing [35].

Also, the farm structure of dairy farms is dominated by small farms where just 1-3 cows are raised, and only a few number of farms grow more than 20 or 50 cows. As it is known, farm size is deeply linked to productivity and efficiency, and the higher the number of dairy cows assures a higher production, a higher value of gross product, a higher gross margin, and profit [25, 26, 28, 30, 33, 34]. Investments in modern farms are justified and most of them are encouraged and supported by EU funds [29].

Beef is another product coming from cattle raised for meat production. However, beef is consumed just in a small proportion in Romania, only about 9 kg per capita per year, but beef is niche for export to the EU countries [43].

Pigs are traditionally reared in Romania, as pork is a traditional meat. However, swine sector is in decline due to the decreasing number of livestock, partially affected by African Swine Fever, but mainly because of

the lack of piglets in the market, high input price, low price per live weight at slaughter [2, 42, 50]. Pork is also consumed in many EU countries and in the world, but the modern consumer is more and more oriented to a healthier meat with less fat and cholesterol, that is why chicken meat is on the top position [40, 51, 52].

Sheep and goats are the only species in Romania whose number was increasing during the last years because of the need of more raw milk for dairies, the special quality of goat milk and also due to the importance of sheep meat for a part of the Romanians and also for export in the Arabian countries. Also, in the mountain areas of Romania there are many sheep farms [4, 5, 45].

Poultry importance is given by the lean and tasty meat rich in high value protein and eggs which are healthy for human diet and also in the processing industry. In Romania, poultry are raised in various systems from industrialized in integrated complexes to traditional farms [22, 23, 24, 48].

General view on livestock and its distribution by individual farms and commercial companies and by size class of utilized agricultural area (UAA)

In 2016, according to National Institute of Statistics, Farm structure survey, Romania had 3,422,026 agricultural holdings, of which 2,489,459 had agricultural land and animals (72.7%) and only 79,818 holdings had only animals (23.3%).

The holdings without legal personality are numerically dominant in Romania, accounting for 99.52% of the total agricultural holdings. About 99.48% have agricultural land and animals and 99.7% farms were raising animals [21].

Most of animals are reared in individual holdings without legal personality as follows: 95.1% goats, 93.3% sheep, 86.9% bovines, 67.4% poultry and 53% pigs. In the commercial companies it is a smaller number of animals, except pigs and poultry which are suitable for industrial farming (Table 4).

Table 4. Romania's livestock by main species and main type of agricultural holding (Livestock units)

	Bovines	Pigs	Sheep	Goats	Poultry
Romania	1,584,790	991,706.2	910,653.6	137,279.2	908,839
Share of individual holdings (%)	86.9	53.0	93.3	95.1	67.4
Share of commercial companies (%)	7.4	44.4	2	1	31.7

Source: Own calculation based on the data from NIS, 2017, Farm structure survey, Romania, 2016 [21].

The highest number of holdings are raising poultry, being followed by pig farms, bovine and sheep and goat farms.

Most of agricultural holdings with animals utilizes a small agricultural area ranging between 1-5 ha. it is about 55.4% bovine farms, 48.8% sheep farms and 45.5% goats farms.

But, 45.4% of pigs farms and 53.3% poultry farms had below 1 ha UAA. Only less than 1% farm animals, except sheep farms, utilizes a higher agricultural land than 20 ha (Table 5).

The most of animals are concentrated in the smallest farms utilizing less than 5 ha. Pigs and poultry are concentrated in the smallest farms with less than 1 ha UAA: 37.1%, and, respectively, 56.3%. Also, 18.6% bovines, 18.2% sheep and 15.1% goats are concentrated in farms which utilizes 5-10 ha UAA. In 2016, the largest farms working 100 and over ha raised 8.8% bovines, 8.15 pigs, 7.2% sheep, 6.1% poultry and 20.6% goats (Table 6).

Table 5. Agricultural holdings with main animals and their distribution by size class of UAA, Romania, 2016

Agricultural holdings	Bovines	Pigs	Sheep	Goats	Poultry
	541,137	1,283,584	208,363	129,916	2,445,555
%	100.0	100.0	100.0	100.0	100.0
Below 1 ha	22.3	45.4	24.3	40.4	53.3
1-5 ha	55.4	43.9	48.8	45.5	38.8
5-10 ha	15.5	7.8	16.4	9.0	5.9
10-20 ha	4.6	2.0	6.3	3.0	1.4
20-30 ha	0.9	0.5	1.6	0.8	0.3
30-50 ha	0.5	0.2	1.1	0.6	0.2
50-100 ha	0.3	0.1	0.8	0.4	0.08
100 and over ha	0.5	0.1	0.7	0.3	0.02

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

Table 6. Livestock by main species and size class of UAA, Romania, 2016

Livestock (heads)	Bovines	Pigs	Sheep	Goats	Poultry
	1,849,279	4,142,785	9,106,536	1,372,792	77,195,179
%	100.0	100.0	100.0	100.0	100.0
Below 1 ha	15.8	37.1	15.0	27.4	56.3
1-5 ha	38.7	25.4	26.6	36.1	26.7
5-10 ha	18.6	6.8	18.2	15.1	5.1
10-20 ha	9.6	18.5	13.4	8.9	1.9
20-30 ha	3.1	1.3	6.2	3.6	0.6
30-50 ha	2.6	1.1	6.9	3.2	2.3
50-100 ha	2.8	1.6	6.5	3.1	1.0
100 and over ha	8.8	8.1	7.2	2.6	6.1

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

Farm structure and average farm size for bovine agricultural holdings

In 2016, of 541,137 agricultural holdings raising bovines, 66.1% had 1-2 animals, 29.4% had 3-9 animals, 2.9% had 10-19 heads and the remaining of about 1.6% were rearing over 20 bovines.

The number of bovines existing in 2019 in Romania accounted for 1,849,279 heads of which 27.8% were grown in farms with 1-2 heads, 37% in farms with 3-9 heads, 11.1% in farms with 10-19 heads, summing 77% and the remaining of 23% was grown in larger farms with more than 20 heads.

In Romania, 5.4% of bovines were raised in farms with 100-499 heads and 4.95% in farms with over 500 heads (Table 7).

Taking into account the number of holdings and the number of bovines, the average farm size was 3.4 heads at the country level.

The highest average accounting for 1,009 bovines was in the largest farms whose share

was just almost 0.05% in the total number of holdings raising bovines. also, 0.15% of holdings had an average size of 184 bovines, and 0.2% farms raised 67.8 heads in average.

If we take into account that individual holdings are dominant representing 98.3% of total holdings with bovines and that they raised 94.9% of bovine livestock, the average size of individual holdings was 2.9 bovines, which varied, by size class of animals, from 1.4 heads in case of the smallest farms (1-2 animals) and 143 heads in case of the largest farms (100-499 heads).

The commercial companies growing bovines were just 743, representing only 0.13% of holdings with bovines, but they raised 156,729 heads, which meant 211 bovines average size per farm.

The variation of farm size by size class of animals was 1.8 heads in case of the smallest commercial companies and 1,022 bovines in case of the largest farms (Table 7).

Table 7. Number of agricultural holding raising bovines by size class of livestock and number of bovines by size class, Romania, 2016

		Size class, Bovines (heads)							
		1-2	3-9	10-19	20-29	30-49	50-99	100-499	500 and over
Agricultural holdings (No.)	541,137								
Share, %	100.0	66.1	29.4	2.9	0.8	0.4	0.2	0.15	0.05
Bovines (heads)	1,849,279								
Share, %	100.0	27.9	37.0	11.1	5.4	4.4	3.9	5.4	4.9
Average bovine farm size (heads)	3.4	1.4	4.3	13.1	23.3	37.0	67.8	184	1,009
Average bovine farm size (heads) in:									
Individual holdings	2.9	1.4	4.3	13.0	23.3	37.0	66.1	143	-
Commercial companies	211	1.8	5.5	14.0	24.5	38.1	72.2	218	1,022

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

In 2016, 472,778 agricultural holdings were raising dairy cows. About 77.2% farms had only 102 cows, 20.3% had 3-9 cows, 1.8% had 10-19 cows and the rest of 0.7% raised over 20 cows. It worth mentioning that 15 farms raised over 500 cows.

In 2016, Romania had 1,137,885 cows, of which 43.8% were raised in the smallest farms (1-2 heads), 33.6% in farms with 3-9 heads, 9.5% in farms with 10-19 cows.

Just 1.1% of dairy cows were grown in farms with more than 500 cows, 3.6% in farms with

100-499 animals, and 2.4% in farms with 50-99 cows.

In consequence, the average size for dairy farms at the national level was 2.14 heads in 2016, and it ranged between 1.4 cows in the smallest farms and 889.4 cows in the largest ones.

Due to the fact that dairy cows were bred predominantly in individual farms, the average size of dairy farms was smaller or equal in a few cases with the average registered by all the categories of holdings (Table 8).

Table 8. Number of agricultural holding with dairy cows and cow livestock by size class, Romania, 2016

		Size class, Dairy cows (heads)							
		1-2	3-9	10-19	20-29	30-49	50-99	100-499	500 and over
Agricultural holdings (No.)	472,778								
Share, %	100.0	77.3	20.3	1.8	0.34	0.2	0.09	0.04	0.03
Dairy cows (heads)	1,137,885								
Share, %	100.0	43.8	33.6	9.5	3.3	2.7	2.4	3.6	1.1
Average Dairy farm size (heads)	2.4	1.4	3.9	12.7	23.0	36.4	67.0	198	889.4
Average dairy farm size (heads) in:									
Individual holdings	2.2	1.4	3.9	12.7	23.0	36.0	65.0	139.4	-
Commercial companies	97.8	1.7	5.3	13.6	23.7	39.2	68.6	217.6	912.2

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

The commercial companies raising dairy cows had a much better average farm size, accounting for 97.8 heads, but taking into account the size class of cows, it varied between 1.7 cows for the smallest companies and 912.2 cows for the biggest ones (Table 8).

Farm structure and average farm size for agricultural pigs holdings

In 2016, Romania had 1,283,584 pigs farms, of which 86.7% were small farms (1-2 heads), 12.1% farms with 3-9 pigs, 1.1% farms with 10-49 pigs, summing 99.9%. The rest of farms were larger farms raising more than 50 pigs. A number of 133 farms raised over 1,000 pigs.

Pig livestock accounted for 4,142,785 heads in 2016, of which 35% were grown in the smallest farms (1-2 heads), 15.4% in farms with 3-9 pigs, 5.1% in farms with 10-49 heads, totaling 54.5% of the total number of pigs. The rest of pigs were raised in farms with more than 50 pigs. In 133 agricultural holdings was grown a number of 1,845,358 heads representing 44.5%.

As a result, the average farm size was 3.2 pigs, but by size class it varied between 1.3

heads in the farms with 1-2 pigs and 13,875 heads in farms raising 1,000 pigs and over.

Therefore, it was noticed a polarization of the number of pigs into two categories: 34% in the smallest farms and 44.5% in the largest ones.

Taking into account that pigs were raised in 1,274,734 individual holdings, representing 99.3% of the total number of swine farms, and that 2,234,673 pigs were bred in individual holdings accounting for 98.1% of total pig livestock, the average size of an individual holding raising pigs was 1.7 heads in the year 2016, but by size class it varied between 1.3 heads in the smallest farms and 2,000 pigs in the largest ones, which in fact were 2 holdings.

Commercial companies raising swine species accounted for 229 units where 1,804,061 animals were grown, meaning 7,878 pigs in average per farm.

The existing 15 smallest commercial societies raised 25 pigs, that is 1.7 heads per farm. But, a number of 123 commercial industrialized units raised 1,783,880 pigs, which led to the conclusion that their average size accounted for 14,503 heads per farm (Table 9).

Table 9. Number of agricultural holding with pigs and pigs livestock by size class, Romania, 2016

		Size class, Pigs (heads)							
		1-2	3-9	10-49	50-99	100-199	200-399	400-999	1,000 and over
Agricultural holdings (No.)	1,283,584								
Share, %	100.0	86.7	12.1	1.1	0.01	0.002	0.0085	0.002	0.001
Pigs livestock (heads)	4,142,785								
Share, %	100.0	34.0	15.4	5.1	0.3	0.11	0.09	0.5	44.5
Average size, Pigs farm	3.2	1.3	4.1	14.8	66.3	120.3	285.2	685	13,875
Average size of a pigs farm (heads) in:									
Individual holdings	1.7	1.3	4.1	14.7	62.7	115.5	232	-	2,000
Commercial companies	7,878	1.7	4.9	23.3	59.2	134.2	279.5	687	14,503

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21]

Farm structure and average farm size for agricultural sheep holdings

The number of holdings raising sheep accounted for 208,363 in the year 2016. The

highest number of sheep farms accounted for 41.7% of the total units and raised 3-9 heads. About 20% of farms had 20-49 heads and 11.4% farms raised 102 sheep. Only 4.6%

farms raised between 200 and 499 sheep and 1.3% farms had 500 and over.

Sheep livestock accounted for 9,106,526 heads, of which 31.4% belonged to the farms with 200-499 heads and 23.2% were grown in the farms with more than 500 heads.

In consequence, the average farm size at the national level was 43.7 sheep, varying between 1.8 heads in the smallest farms and 810.5 heads in the biggest ones.

About 98.7% of sheep livestock was raised in 8,496,853 individual holdings, representing 95.9% of the sheep farms. As a result, the

average farm size of the individual sheep farms was 41.2 heads and by size class, the average ranged between 1.8 heads in the smallest farms and 765.2 sheep in the largest ones.

Also, 190,417 sheep were raised in 202 commercial societies, meaning that the average size of such an unit accounted for 942.6 heads. However, the average by size class varied between 2 heads in the smallest commercial companies and 2,163.2 heads in the biggest ones (Table 10).

Table 10. Number of sheep agricultural holding and sheep livestock by size class, Romania, 2016

		Size class, Sheep (heads)							
		1-2	3-9	10-49	50-99	100-199	200-399	400-999	1,000 and over
Agricultural holdings (No.)	208,363								
Share, %	100.0	11.4	41.7	20.0	8.6	6.7	5.7	4.6	1.3
Sheep livestock (heads)	9,106,526								
Share, %	100.0	0.5	5.0	5.6	5.5	10.5	18.1	31.4	23.2
Average size, Sheep farm	43.7	1.8	5.3	12.3	28.0	68.4	138.5	295.2	810.5
Average size of a sheep farm (heads) in:									
Individual holdings	41.3	1.8	5.3	12.3	28.0	68.2	138.6	295	765.2
Commercial companies	942.6	2.0	5.8	12	31.6	67.9	139.8	328	2,163.2

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21]

Farm structure and average farm size for agricultural goats holdings

In 2016, Romania had 129,916 holdings raising goats, of which 49.9% farms had 1-2 heads and 30.4% had 3-9 heads. Only 34 farms, representing 0.2% of the total goats farms, were grown 500 goats and over.

In 2016, a number of 1,372,792 goats existed in Romania. By size class, 19.9% animals belonged to the size class 50-99 heads, 18.5% to the class 100-199 heads, 17.8% to the class 20-49 heads and 11.5 to the class 200-499 animals. Only 1.7% of the number of goats was concentrated in 34 agricultural holdings summing 23,323 heads.

In consequence, the average farm size was 10.6 goats at the national level, ranging between 1.6 heads in the smallest farms with

1-2 heads and 686 heads in the biggest farms breeding 500 goats and over.

Goats are predominantly raised in individual households and the average farm size is similar with the one of the size class 1-2 heads up to the size class 100-199 heads.

The only difference appeared in case of the largest individual holdings which had 270.9 goats in average for the size class 200-499 and 650 goats for the class 500 and over.

A number of 13,810 goats were grown in 76 commercial companies and this meant 896.3 goats per farm in average. By size class, the highest average was 896.3 goats, registered by 6 commercial units rearing 500 heads and over, and 309 goats represented the average recorded by 15 commercial companies raising 200-499 heads (Table 11).

Table 11. Number of agricultural holding with goats and goats livestock by size class, Romania, 2016

		Size class, Goats (heads)							
		1-2	3-9	10-19	20-49	50-99	100-199	200-499	500 and over
Agricultural holdings (No.)	129,916								
Share, %	100.0	49.9	30.4	8.5	6.0	3.1	1.5	0.4	0.2
Goats livestock (heads)	1,372,792								
Share, %	100.0	7.4	13.6	10.1	17.8	19.9	18.5	11.0	1.7
Average size, Goats farm	10.6	1.6	4.7	12.5	30.8	67.6	132	279.6	686
Average size of a goats farm (heads) in:									
Individual holdings	10.1	1.6	4.7	12.5	30.8	67.6	132	270.9	650
Commercial companies	181.7	-	-	12.3	32.6	71.1	147.2	309	896.3

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

Farm structure and average farm size for agricultural poultry holdings

In 2016, in Romania, there were 2,445,555 agricultural holdings raising 77,105,170 poultry.

About 99.7% of poultry farms were small farms raising 1-99 birds. The remaining were growing over 100. To specify that 0.002% of

the poultry farms, more exactly 67 holdings raised 100,000 and over heads.

The number of poultry was different distributed by size class. About 57.7% poultry was in the size class 1-99 birds and at the other pole, it was the class with 100,000 heads and over, concentrating 35.3% of poultry livestock (Table 12).

Table 12. Number of agricultural holding with poultry and poultry livestock by size class, Romania, 2016

		Size class, Poultry (heads)								
		1-99	100-499	500-999	1,000-2,999	3,000-4,999	5,000-9,999	10,000-49,999	50,000-99,999	100,000 and over
Agricultural holdings (No.)	2,445,555									
Share, %	100.0	99.7	0.3	0.001	0.001	0.001	0.001	0.002	0.001	0.002
Poultry livestock (heads)	77,195,179									
Share, %	100.0	57.7	1.3	0.02	0.08	0.2	0.26	2.1	3.4	35.3
Average size, Poultry farm	31.6	18.2	131.5	644.2	1,831	3,918.7	7,076	24,274.3	71,482.5	405,828
Average size of a poultry farm (heads) in:										
Individual holdings	18.7	18.2	130.8	629	1,510	3,949	5,000	-	-	-
Commercial companies	96,009.2	30.7	156.9	830	1,979.8	3,918.6	7,059.7	24,108.3	71,482.5	410,041.33

Source: Own calculation based on NIS, 2017, Farm structure survey, Romania, 2016 [21].

In consequence, the average poultry farm size was 31.6 heads at the country level, but by size class it varied between 18.2 heads in the

smallest farms raising 1-99 birds and 405,828 heads in the biggest farms with over 100,000 heads.

The average size of the individual poultry holdings accounted for 18.7 heads at the country level, by size class it ranged between 18.2 birds in case of the farms raising 1-99 heads and 5,000 birds in case of only one individual farm.

The commercial companies registered 96,009.2 birds average size, but its value varied between 30.7 birds in the smallest units and 410,041.3 birds in the companies with 100,000 heads and over, where farming process is industrialized and vertically integrated (Table 12).

CONCLUSIONS

In Romania there is a high number of animal holdings raising especially bovines, pigs, sheep and goats and poultry.

The main aspect which influences farm structure is the decline in livestock both in case of bovines, dairy cows, pigs and poultry, except sheep and goats. This trend is an advantage to increase average farm size and production efficiency.

The average farm size is very small for all the animal farms.

From the total number of agricultural holdings, 72.7% have land and animals and 23.3% are raising only animals.

Individual holdings are dominant no matter the species. In the total number of holdings, the individual holdings had the following share in the year 2016: 86.9% bovine farms, 53% pig farms, 93.3% sheep farms, 95.1% goats farms and 67.4% poultry farms.

Commercial holdings had the highest share in case of pig farms, 44.4% and poultry farms, 31.7%.

The average farm size at the national level in animal farms was the following one in the year 2016:

3.4 bovines, 2.4 dairy cows, 3.2 pigs, 43.7 sheep, 10.6 goats and 31.6 poultry.

In the individual holdings, the average farm size was the following one: 2.9 bovines, 2.2 dairy cows, 1.7 pigs, 41.3 sheep, 10.1 goats and 18.7 poultry. It is obvious that the individual farms are small scale farms.

In the commercial companies the average farm size was completely different: 211

bovines, 97.8 dairy cows, 7,878 pigs, 942.6 sheep, 181.7 goats and 96,009.2 poultry.

Therefore, farm structure does not compile with efficiency in many farms. For this reason, standard output is small in animal holdings of Romania.

The decline in livestock for bovines, pigs and poultry has led to the disappearance of a part of small farms and also due to farmers aging and their incapacity to face the market pressure.

Also, the EU funds provided by PAC have been and are of much help for creating new farms and modernize the old ones to improve farm structure and average farm size and to increase production and its efficiency.

The data used in this study created an image about the situation in 2016, but for sure in the interval 2017-2021, other changes have occurred in the number of holdings, farm structure and average farm size.

It remains that a new Farm Survey and Census in 2013 to bring new data for being able to have a clear picture of the reality in animal sector regarding the approached aspects.

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