ROMANIA'S CONTRIBUTION TO THE EUROPEAN UNION'S AGRICULTURE IN THE PERIOD 2010-2020

Agatha POPESCU[1]

Abstract. *The purpose of this study was to analyze Romania's contribution to the EU agriculture using Eurostat data, fixed index, trend equations, determination coefficient, and descriptive statistics. For its high number of farms, Romania occupies the top position in the EU, but for only 3.6 ha utilized agricultural area per farm, the country is far away from 16.7 ha UAA the EU average. The standard output pushes Romania on the 8th position in the EU, but for only Euro 3,537 standard output per farm, it comes on the last position. In 2019, agricultural output reached Euro 18.9 Billion, reflecting a contribution of 4.2% to the EU output and that Romania was ranked the 8th in the EU. Due to its inbalanced crop/animal output ratio of 3.38, Romania's share in the EU crop output is 55.72%, while in animal output is only 2.2%. Romania is ranked the 8th in the EU for GVA 8.78 Billion and 4.56% contribution to the EU. Compared to 2010, in 2019, income from agriculture (Indicator A) was by 39.9% higher in Romania, being exceeded only by Italy which had +41.03%. About 4.1% of Romania's GDP comes from agriculture compared to Greece 3%, Spain 2.4%, Poland 2.2%, Italy 1.8%, Netherlands 1.6%, France 1.2%, Germany 0.6%, and United Kingdom 0.5%. Romania plays an important role in the EU agriculture and has to continue the implementation of CAP being focused on the sustainable development of this sector to obtain a higher economic performance under a more balance use of resources, preservation of the environment factors and being much better adapted to the challenges of climate change. Setting up associative forms of production, modernizing technical endowment, assuring a higher training level to the farmers, producing more gross value added along the product chain, Romania could increase its agricultural production value and its contribution to the EU agriculture.*

Keywords: farm structure**,** standard output, agricultural output, gross value added, Romania

1. Introduction

The performance in agriculture is given by interrelationships between the used production factors: agricultural land, technical endowment reflected by the fixed capital, technologies applied, human capital or labor force and financial capital [12]. Also, it is conditioned by farm structures and production systems [25].

Every country makes efforts to develop agriculture as it is one of the most important branch of the economy which is destined to assure food security of the population, to supply agricultural raw materials for processing industry, to sustain

[1]Prof. Ph.D. Eng. Econ. University of Agronomic Sciences and Veterinary Medicine, Bucharest, Romania, Full Member of the Academy of the Romanian Scientists, Corresponding Member of the Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Sisesti" (e-mail: agatha_popescu@yahoo.com).

export, trade and payment balance, to offer jobs and income for farmers and rural population, for protecting environment and biodiversity [1, 18, 22].

Romania has a high agricultural potential and its entry into the EU since 2007 has been a crucial moment for achieving a higher performance in this field of activity, joining its efforts with other countries like France, Germany, Italy, Spain, United Kingdom, Netherlands, Poland and Greece for contributing to the sustainable development of agriculture according to the EU Common Agricultural Policy.

To assess the development of agriculture of a country, there is a large range of indicators included in the economic accounts (EAA) which provide detailed information on income generated by agricultural production. As a satellite account of the European System of Accounts (ESA), the EAA provides information adapted to the specificity of the agricultural industry:

-*gross domestic product (GDP)* created in agriculture which allow to evaluate the sector contribution to the national economy and to assure a reference term for making comparisons among various countries regarding the development of their agriculture [15]; the level of GDP is deeply influenced by technical endowment (fixed assets volume and structure), and also by employment in agriculture [11, 16, 17, 19, 23, 24];

- *agricultural output at basic and producer prices* describes the value of goods and services achieved processes of production; detailed analysis is depicted about crop output, animal output and the value of services related to agriculture [5, 6, 7];

-*intermediate consumption in agriculture* regards the purchases made by farmers for raw and auxiliary materials needed in crop production (seeds, fertilizers, plant protection) and animal production (feeding stuffs, and veterinary expenses) and also the required services, repairs, maintenance etc.;

- *gross value added (GVA) created in agriculture* results from the difference between the value of agricultural output and the value of various input costs involved in the production process, adjusted for taxes and subsidies on products. It reflects how much value added is produced by every 1 euro spent on the cost of goods and services used in the production process (intermediate consumption) [8];

-*subsidies granted to the EU member states* according to their relative weight in the output value of the EU-28's agricultural industry and even higher; their type and amount have changed over time as a result of successive reforms of the CAP ('decoupling' subsidies from particular crops, single farm payments, subsidies on products, subsidies on production etc)

-*taxes* (income taxation, tax on property and wealth, Inheritance and gift tax, other taxes) [26];

-*labour input in agriculture* is provided first of all by the farmers and their family members, being known that the EU agriculture is characterized by family farming; secondly, the seasonality of the agricultural activities (for example, labour peaks at harvesting) imposes to hire workers for a relatively short period of time; thirdly, some farmers are occupied on a part-time basis as they have another important income source. For this reason, the volume of labour input in agriculture is expressed in terms of full-time labour equivalents, AWU (annual work units) [13, 14, 20, 21];

-*labour productivity* quantifies the result of work in agriculture in terms of "income", which is a key measure for determining the viability of the agricultural sector. Factor income in the EAA is the remuneration of all the used production factors (land, labour and capital). It reflects the net value added at factor cost, after adjusting gross value added for the consumption of fixed capital, and subsidies and taxes on production. Within agricultural accounts, labour productivity is expressed as an index, which reflects "the net value added by the equivalent of each full-time worker" in the agricultural industry. Therefore, it is computed on the basis of the real factor income per AWU [9]. This factor income is justified by the specificity of seasonal agricultural activities which result in more part-time activities than full-time.

In this context, the paper aimed to analyze the contribution of Romania to the EU's agriculture in the period 2010-2020, but also in 2020 according to the available data provided by Eurostat. The main indicators taken into consideration in this study were: number of the agricultural holdings, of which family farms; utilized agricultural area (UAA) and average UAA per farm, number of animal farms; standard output and standard output per farm; output of the agricultural industry, of which crop and animal output; gross value added (GVA) in agriculture; indicator A of the income from agricultural activity and the contribution of agriculture to GDP. Based on the level of the main indicators there were made comparison between Romania and the main agricultural EU-28 member states: France, Germany, Italy, Spain, United Kingdom, Netherlands, Poland and Greece in order to assess Romania's position and its contribution to the EU agriculture.

2. Materials and Methods

This research is based on Eurostat data base for the main indicators characterizing agriculture in Romania in comparison with other main agricultural EU-28 member states: France, Germany, Spain, Italy, United Kingdom, Netherlands, Poland, and Greece.

The period of analysis was in general 2010-2019 and in some cases 2010-2020 depending on the available data.

The indicators analyzed in this study were: number of farms, of which family farms; utilized agricultural area (UAA); average farm size in terms of UAA/farm; standard output and standard output per farm; agricultural production value; crop and animal production value; gross value added created in agriculture; indicator A of the income from agricultural activity; contribution of agriculture to GDP.

The main statistical procedures used in this research were:
- Fixed basis index, $I_{FB\%} = (x_n/x_1)$ x100 used for reflecting the increase/decrease of an analyzed indicator in the year 2019 or 2020 compared to 2010.
- Market share of Romania compared to the selected EU countries in the EU level for the analyzed indicators:
-Polynomial Regression equation, $Y = ax^2 + bx + c$ for reflecting the general tendency of the studied indicator over the time.
-The coefficient of determination, R^2, for showing the dependence of the variation of an indicator on the time variation.
-Descriptive statistics in terms of: mean, deviation standard, coefficient of variation, minimum and maximum value for agricultural output and gross value added in the period 2010-2020.
The obtained results were synthesized in tables and illustrated in graphics and the corresponding comments were made. The conclusions point out the main ideas resulting from this research.

3. Results and Discussions

3.1. Number of the agricultural holdings

Romania is the country with the most numerous farms and also with the most numerous small farms in the EU. In 2016, Romania had 3,422,000 agricultural holdings, coming on the top position in the EU-28. However, other countries like Poland, Italy and Spain have also many agricultural holdings: 1,410,000, 1,145,710, and respectively, 945,020. All these four countries keep 8,923,400 farms representing 66.15% of the total number of agricultural holdings in the EU-28 accounting for 10,465,000 at that time. Therefore, Romania had 32.6% of the total number of agricultural holdings in the EU-28 [3] (Fig. 1).

3.2.Family farming is dominant

In 2016, in the EU-28 there were 9,962,680 family farms representing 95.2% of the total number of agricultural holdings. Romania, Poland, Italy, Spain, followed by Greece, France, Hungary, Germany, United Kingdom and Netherlands, all together accounted for 86.17% of all the EU-28 family farms. Therefore, the EU agriculture is characterized by family farming (Fig.1).

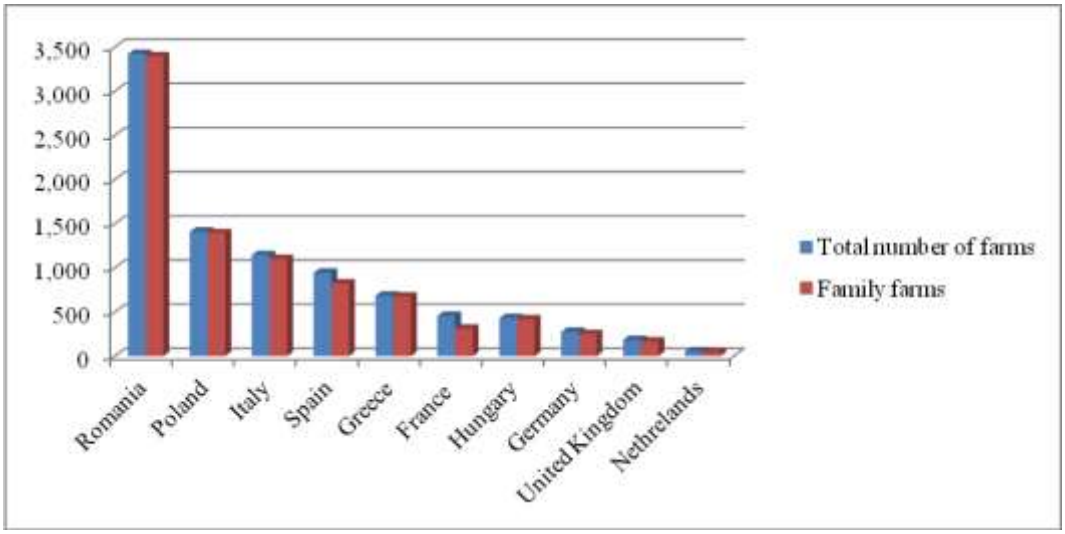

Fig.1. The number of farms, of which family farms existing in Romania and other selected EU-28 member states in 2016
Source: Own design based on the data from [3].

In Romania, 99.2% of the agricultural holdings are family farms, in general small sized-farms most of them being of a subsistence profile. In the selected countries mentioned above, the share of family farms is the following one: 98.7% in Poland and in Greece, 97.2% in Hungary, 96% in Italy, 90.9% in Germany, 90.8% in United Kingdom, 89.7% in Netherlands, 87.08% in Spain and 68.34% in France.

More than this, of the total number of farms existing in Romania 2,956,380 farms have households which consume over 50% of the final production, representing 86.39% of the total number of farms. In the other selected EU countries, the situation is the following one: 59.7% in Hungary, 25.3% in Italy, 18.3% in Poland, 16% in Greece, 3.5% in Spain, 1.5% in France and zero in United Kingdom, Germany and Netherlands.

3.3. Utilized agricultural area

Romania has 14.6 million ha agricultural land, but only 12,502,540 ha, that is 85.45% is utilized at present. More than this, 6,871 thousand ha belong to the family farms, meaning 54.95% of the utilized agricultural land (UAA). Therefore, the difference of 45% is worked by the agricultural commercial companies.
For the size of UAA, Romania is situated on the 7th position in the EU-28 after France, Spain, Germany, United Kingdom, Poland and Italy. In most of these countries, the share of the UAA in family farms is higher than in Romania as follows: 60.8% in Spain, 64.1% in Germany, 66.6% in Greece, 68% in United

Kingdom, 83% in Italy and 85.6% in Poland. France is the only exception where the UAA in family farms represent only 44.6% of the total UAA (Fig. 2).

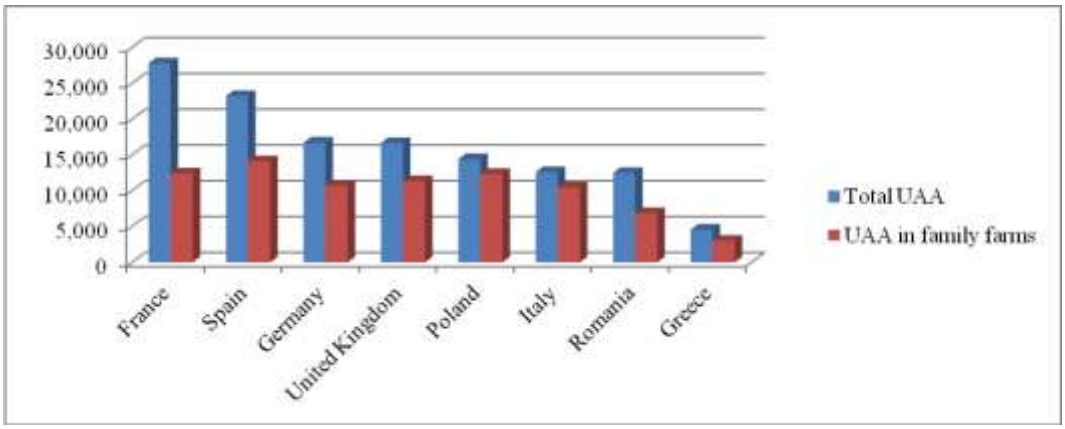

Fig. 2. The total utilized agricultural area, of which in family farms in Romania and other selected EU-28 member states
Source: Own design based on the data from [2, 3].

3.4. Average UAA per farm

Due to the high number of farms existing in Romania, the UAA per farm is one of the smallest in the EU, accounting for 3.6 ha and the UAA per family farm is only 2.02 ha.
However, compared to the EU-28 average UAA/farm of 16.7 ha, other selected EU countries have also a smaller UAA/holding like: Greece (6.64 ha), Poland (10.21 ha) and Italy (10.99 ha) (Table 1).

Table 1. The average UAA/farm in Romania and the selected EU countries (ha/farm)

	Average total UAA/Farm	Average UAA/ Family farms	Differences
EU-28	16.7	10.8	-5.9
Romania	3.6	2.02	-1.58
Poland	10.21	8.85	-1.35
Italy	10.99	9.51	-1.48
Spain	24.58	17.16	-7.42
Greece	6.64	4.48	-2.16
France	60.93	39.82	-21.11
Germany	60.53	42.70	-17.83
United Kingdom	90.65	67.97	-22.68

Source: Own calculation based on the data from [2, 3].

A higher UAA than the EU average is in United Kingdom (90.6 ha), Luxemburg (65 ha), France (60.9 ha), Germany (60.5 ha), Denmark (55 ha) and Spain (24.5

ha). It is obviously that in the family farms in all the EU countries, the UAA is smaller than the average UAA per total number of holdings.
The small UAA indicates a low production potential capacity and economic performance of the farm. the smallest average farm size is in Malta, Cyprus and Romania where it ranges between 1 and 3.6 ha (Table 1).

3.5. Number of farms with livestock

An important number of farms in the EU is raising animals: bovines, swine, sheep and goats, poultry, horses etc.
Romania is also in the top position from this point of view having 2,567,430 animal farms, having a share of 75% in the total number of farms. A high number of farms with livestock is in Poland (718,900, that is 50.9%). Also Hungary, France, Greece, Spain, Germany, Portugal, Italy, United Kingdom, Bulgaria and Ireland have a high number of farm animals (Fig.3).

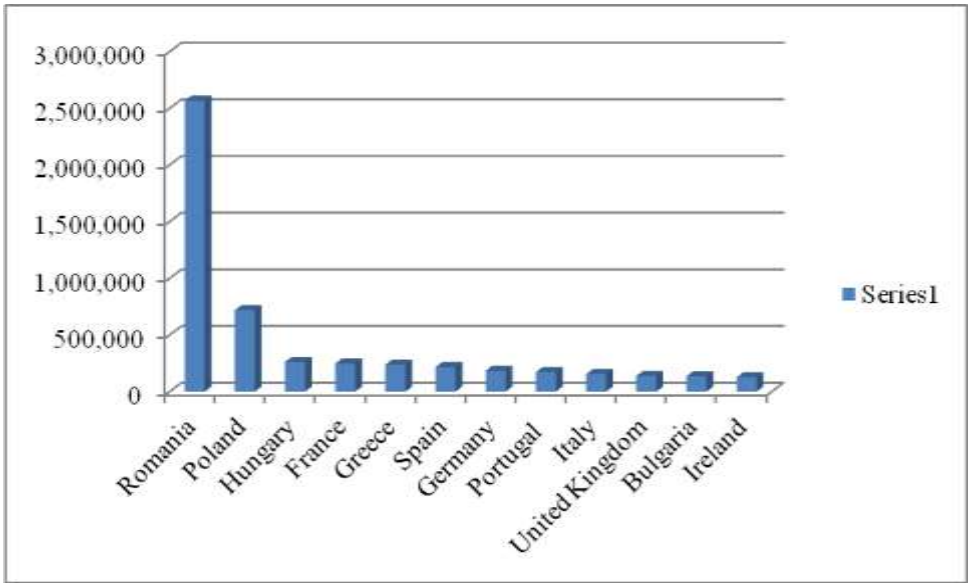

Fig. 3. The number of farms with livestock in Romania and other EU-28 countries
Source: Own design based on the data from [4].

The share of the number of farm animals in the total number of farms differs from a country to another reflecting the importance of animal farming in each member states' agriculture, the production performance, the applied technologies and the local favorable conditions for the development of animal husbandry.
The highest share of animal farms in the total farms is in Romania and United Kingdom (75%), Germany (66.8%), Hungary (60.8%), France (54.2%), and Poland (50.9%). A lower share of animal farms is in Italy (13.5%), Spain (22.9%) and Greece (34.8%).

3.6. Standard output

Standard output reflects the economic efficiency of agricultural activities in a farm and is the main synthetic indicator allowing comparisons in the agriculture of the EU member states.

Romania registered Euro 12,105 Million standard output (SO), coming on the 8th position in the EU after France, Italy, Germany, Spain, United Kingdom, Poland and Netherlands (Fig.4).

Therefore, Romania's performance in agriculture is five times lower than in France, 4.27 times smaller than in Italy, 4.06 times lower than in Germany, 3.16 times smaller than in Spain, 2.09 times than in United Kingdom, 2.06 times than in Poland and 1.9 times than in Netherlands.

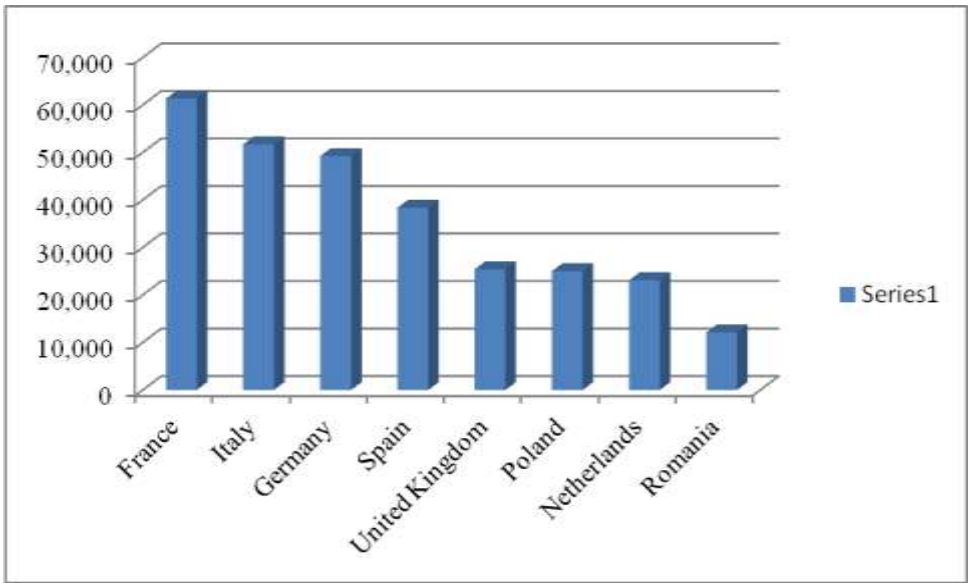

Fig. 4. Romania's standard output compared to SO in the selected EU-28 Countries (Euro Million)
Source: Own design based on the data from [2].

3.7. Standard output per farm

Taking into consideration the value of standard output and the number of farms, Romania registered a very low standard output per farm, accounting for only Euro 3,537, which reflects a low efficiency and average economic size of the agricultural holdings.

In the selected EU countries, the highest SO per farm was achieved in Netherlands and accounted for Euro 414,637, having in mind that this member state has a small number of farms of about 55,680. Also, a high SO per farm was carried out

in the decreasing order by: Germany, United Kingdom, France, Italy, Spain, and Poland (Fig. 5).

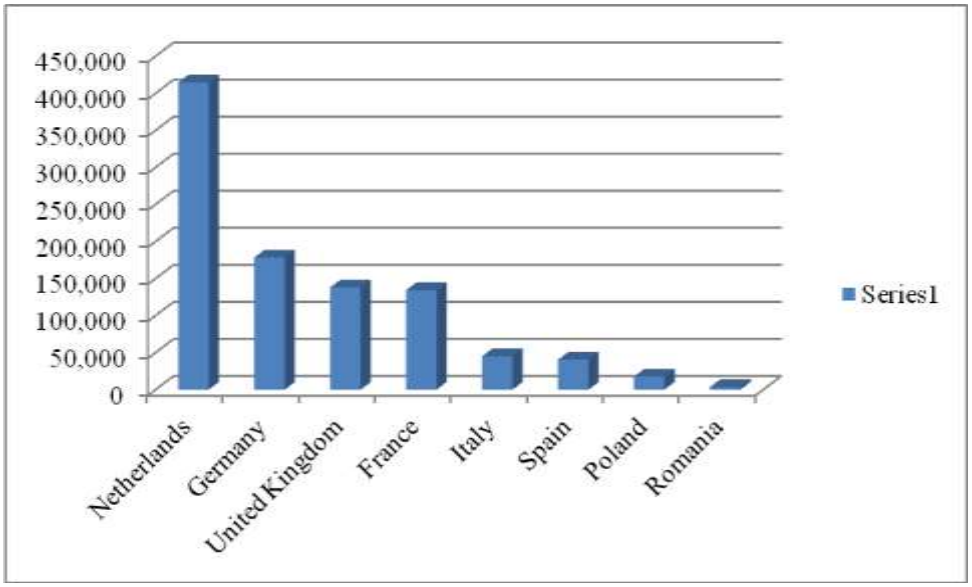

Fig. 5. Romania's standard output per farm compared to SO per farm in the selected EU-28 Countries (Euro per farm)
Source: Own calculation and design based on the data from [2].

3.8. Output of the agricultural industry

Romania carried out Euro 18.9 Billion agricultural output in 2019, by 23.5% more than in 2010 (Table 2).

Table 2.Output in the agricultural industry in Romania compared to other selected EU-28 countries in 2019 versus 2010 (Euro Billion)

	2019	2010	2019/2010 (%)	Market share in 2019 (%)
EU-28	448.5	372.0	120.5	100.00
1.France	77.0	68.1	113.0	17.16
2.Germany	58.5	49.8	117.4	13.04
3.Italy	57.8	48.0	120.4	12.88
4. Spain	51.6	40.3	128.0	11.50
5.United Kingdom	30.8	23.7	129.9	6.86
6.Netherlands	29.1	25.4	114.5	6.48
7.Poland	26.3	19.7	133.5	5.85
8. Romania	18.9	15.3	123.5	4.21
9. Greece	11.9	10.9	109.1	2.65

Source: Own calculation based on the data from [5].

This situated the country on the 8th position in the EU-28 after France, Germany, Italy, Spain, United Kingdom, Netherlands and Poland, being followed by Greece. Therefore, Romania contributed by 4.2% to the EU agricultural output in 2019 versus 4.1% in 2010.
These nine member states achieved Euro 361.9 Billion agricultural output in 2019, which accounted for 80.69% on the total EU-28 output produced in the agricultural industry (Table 2).

Crop output achieved in Romania accounted for Euro 13.26 Billion in 2019, being by 28.5% higher than in 2010. For this performance, Romania came on the 6th position in the EU-28, contributing by 5.72% to the EU crop output.
Romania is situated among the nine EU member states where crop output is the best developed: France, Italy, Spain, Germany, Netherlands, Romania, Poland, United Kingdom, Greece, which all together carried out Euro 191.59 Billion from crop farming contributing by 82.715 to the EU crop output (Table 3).

Table 3. Crop Output in Romania compared to other selected EU-28 countries in 2019 versus 2010 (Euro Billion)

	2019	2010	2019/2010 (%)	Market share in 2019 (%)
EU-28	231.64	196.88	117.6	100.00
1.France	43.35	39.16	110.6	18.71
2.Italy	31.40	26.56	118.2	13.55
3.Spain	29.99	25.03	119.8	12.94
4.Germany	27.89	24.86	112.1	12.04
5. Netherlands	14.38	12.63	113.5	6.20
6.Romania	13.26	10.32	128.5	5.72
7.Poland	11.67	10.00	116.7	5.03
8.United Kingdom	11.39	8.62	132.1	4.91
9.Greece	8.26	7.38	111.9	3.56

Source: Own calculation based on the data from [6].

Animal output in Romania is 3.38 times smaller than crop production, reflecting an inbalanced ratio between the two basic sectors of the agricultural industry.
In 2019, Romania carried out Euro 3.92 Billion animal output, that is 7.9% more than in 2010. The country contribution to the EU-28 animal output was very small, only 2.2% in 2019.
However, for its animal output, Romania came on the 8th position in the EU after Germany, France, Spain, United Kingdom, Italy, Poland and Netherlands, being followed by Greece. All these nine countries together achieved Euro 137.71 Billion output in animal sector and had a share of 77.46% in the EU-28 animal output (Table 4).

Table 4. Animal Output in Romania compared to other selected EU-28 countries in 2019 versus 2010 (Euro Billion)

	2019	2010	2019/2010 (%)	Market share in 2019 (%)
EU-28	177.76	144.60	122.90	100.00
1. Germany	27.35	22.68	120.50	15.38
2.France	26.57	23.15	114.70	14.94
3.Spain	19.91	13.79	144.37	11.20
4. United Kingdom	16.42	12.87	127.58	9.23
5. Italy	15.80	14.35	110.10	8.88
6. Poland	14.01	9.14	153.28	7.88
7.Netherlands	11.17	9.42	118.50	6.28
8. Romania	3.92	3.63	107.90	2.20
9.Greece	2.56	2.54	100.70	1.44

Source: Own calculation based on the data from [7].

Crop/Animal output ratio

Based on the absolute values of crop and animal production it was determined the ratio between crop and animal output in Romania and the selected EU countries. First of all, in almost the selected EU countries the crop output is higher than animal output, except Poland and United Kingdom where animal sector achieved a higher output than the crop sector.

In 2019, Romania had the highest crop/animal output ratio accounting for 3.38, being followed by Greece with 3.22. These two countries have an inbalance ratio between the two agricultural sectors.

The countries with a more balanced ratio are: Spain (1.50), Netherlands (1.55), France (1.63), Italy (1.98) and Germany (2.11).

In Poland animal output exceeds crop output and the ration crop./animal output was 0.83 while in United Kingdom is a similar situation this ration accounting for 0.69.

Table 5. Crop/animal output ration in Romania compared to the other EU selected countries in 2019 versus 2010

	EU-28	FR	ES	DE	IT	NL	RO	PL	UK	EL
2019	1.30	1.63	1.50	2.11	1.98	1.55	3.38	0.83	0.69	3.22
2010	1.36	1.69	1.81	1.09	1.85	1.34	2.84	1.09	0.66	2.90
Differ. 2019-2010	-0.06	-0.06	-0.31	+1.02	+0.13	+0.21	+0.54	-0.26	+0.03	+0.32

Source: Own calculation.

In the last decade, it is noticed a general increasing trend in almost all the selected EU countries, including Romania, except: France, Spain and Poland, which recorded a negative differences: (-0.06, -0.31, -0.26).
At the EU-28 level crop/animal output ratio was 1.30 in 2019 by -0.06 smaller than in 2010, and this shows that in other member states this ratio declined in the last year of the study (Table 5).

3.9. Comparison regarding the main descriptive statistics of the agricultural output in the period 2010-2020

In order to point out much better Romania's performance in agriculture compared to the selected EU countries, there were determined the main parameters of the descriptive statistics in terms of: mean, deviation standard, coefficient of variation, minimum and maximum value.
The results presented in Table 6 prove that Romania achieved Euro 16,794.64 Million agricultural output in average the interval 2010-2020, which situates the country on the 8th position in the EU-28. The minimum agricultural output was Euro 14,410.22 Million achieved in the year 2012, which was a year with a severe drought in Romania, and the maximum agricultural output was Euro 18,963,83 carried out in the year 2019. The year 2020 was also an unfavorable year for agriculture in Romania, and that is why agricultural output declined by 11.2% compared to the level attained in 2019.

Table 6. Descriptive statistics in terms of mean, standard deviation, variation coefficient, minimum and maximum value for agricultural output achieved in Romania compared to the selected EU-28 countries in the period 2010-2020 (Euro Million)

	Mean	Standard deviation	Coefficient of variation (%0	Minimum	Maximum
1. France	74,260.0	2,955.14	3.97	68,125.2	78,295.39
2. Germany	55,751.41	3,100.62	5.56	49,838.51	59,721.43
3. Italy	55,213.69	2,998.48	5.43	48,053.87	58,515.19
4. Spain	46,615.88	4,714.43	10.11	40,371.17	52,919.36
5. United Kingdom	29,352.82	2,415.98	8.23	23,745.75	32,598.37
6. Netherlands	27,527.05	1,164.01	4.22	25,474.96	29,138.34
7. Poland	23,776.43	2,129.30	8.95	19,750.51	27,177.73
8. Romania	16,794.69	1,481.74	8.82	14,410.22	18,963.83
9. Greece	11,205.16	483.55	4.31	10,610.38	11,880.09

Source: Own calculation based on the data from [6].

France occupies the top position in the EU-28 for its average agricultural output of Euro 74,260 Million in the last decade. On the 2nd position is Germany with Euro 55,751.41 Million, on the 3rd position came Italy with an average of Euro

55,213 Million, on the 4th position is situated Spain with Euro 46,615.88 Million, on the 5th position is United Kingdom with an average of Euro 29,352.82 Million, on the 6th position is Netherlands with an average of Euro 27,527.05 Million, on the 7th position is Poland with a mean agricultural output of Euro 23,726.43 Million, and on the 9th position is Greece which recorded a mean agricultural output of Euro 11,205.16 Million.
The variation coefficients had values ranging between 3.97% in France and 10.11% in Spain showing a reduced variation in the analyzed interval and confirming that the means are representative.
The highest agricultural output was Euro 78,295.39 Million registered in France in the year 2018, and the lowest agricultural output was Euro 10,610.38 Million recorded in Greece in the year 2011.

The EU's agricultural industry was an estimated EUR 411.8 billion in 2020, which includes the value of crops and animal production and also of agricultural services, as well as other goods and services related to agriculture. While crop production has a share of 52.8%, animal production of 38.6% and the remaining of 8.5% belongs to services.
Four countries: France, Germany, Italy and Spain produced more than 58.6% agricultural output, and another group of three countries: Netherlands, Poland and Romania achieved 17.6%, all these seven EU member states accounting for 76.2% of the EU agricultural output in the year 2020 [12].

3.10. Gross value added in agriculture

In 2019, Romania achieved Euro 8.78 Billion gross value added (GVA) in agriculture, by 33.23% more than in the year 2010. This meant 4.56% of the GVA carried out in the EU-28.
Romania came on the 8th position in the EU for GVA and had the highest growth rate in the interval 2010-2019 accounting for +33.23%, being situated after United Kingdom which registered a surplus of +47.88% in GVA in the same period.
The nine selected EU countries together produced Euro 162.89 Billion GVA in 2019, which accounted for 84.64% in the EU-28 GVA registered in the agricultural industry.
The results presented in Table 7 show that Romania is situated on the 8th position for the average GVA achieved in agriculture in the period 2010-2020, accounting for Euro 7,402.8 Million, with a minimum of Euro 6,209.14 Million recorded in the year 2012 when the severe drought had a deep impact and the maximum value of Euro 8,786.3 Million registered in the year 2019. In 2020, GVA accounted for Euro7,921.71 Million being by about 10% smaller than in the previous year.
The hierarchy of the selected EU-28 member states based on the average GVA created in agriculture during the period 2010-2010 is the following one: Italy,

France, Spain, Germany, United Kingdom, Netherlands, Poland, Romania and Greece.
The highest GVA was Euro 33,867.36 Million registered in Italy in the year 2018, and the lowest GVA was Euro 5,313.51 recorded in Greece in the year 2012 (Table 7).

Table 7. Descriptive statistics in terms of mean, standard deviation, variation coefficient, minimum and maximum value for GVA in Romania's agriculture compared to the selected EU-28 countries in the period 2010-2020 (Euro Million)

	Mean	Standard deviation	Coefficient of variation (%0	Minimum	Maximum
1. Italy	31,286.05	2,268.78	7.25	26,236.75	33,867.36
2. France	29,445.56	2,185.61	7.42	26,284.14	33,735.01
3. Spain	25,206.26	3,260.80	12.93	21,248.9	29,287.97
4. Germany	19,044.42	2,404.04	12.62	15,464.91	22,088.17
5. United Kingdom	10,586.69	1,176.20	11.11	7,810.99	11,944.57
6. Netherlands	10,213.63	938.77	9.19	8,475.61	11,743.67
7. Poland	9,238.46	1,032.86	11.18	7,858.6	11,045.32
8. Romania	7,402.8	860.99	11.63	6,209.14	8,786.3
9. Greece	5,770.25	317.28	5.49	5,313.51	6,144.42

Source: Own calculation based on the data from [8].

In 2020, the EU agriculture produced Euro 177 Billion GVA and for every 1 euro spent on the cost of goods and services used in the production process (intermediate consumption), the EU's agricultural industry created added value of EUR 0.75.
However, both agricultural production and GVA declined in 2020 compared to the year 2019 by -1.4% and, respectively, by -2.2% [10].

3.11. Indicator A of the income from agricultural activity

According to Eurostat, "Indicator A corresponds to the deflated (real) net value added at factor cost of agriculture, per total annual work unit. As deflator is used the implicit price index of GDP.
If we consider the year 2010 = 100, the decreasing order of the selected EU countries based on the growth rate achieved for the Indicator 1 of the income from agriculture was the following one in the year 2019: Italy +41.03%, Romania +39.97%, Poland +39.92%, Spain +27.94%, Germany +17.53%, France +15.99, United Kingdom +10.76, Greece +6.74% and Netherlands - 4.27% (Fig. 6).

In 2020, in the EU, there were 8.5 million full-time workers representing labor force input, of which 6.2 workers were non-salaried.

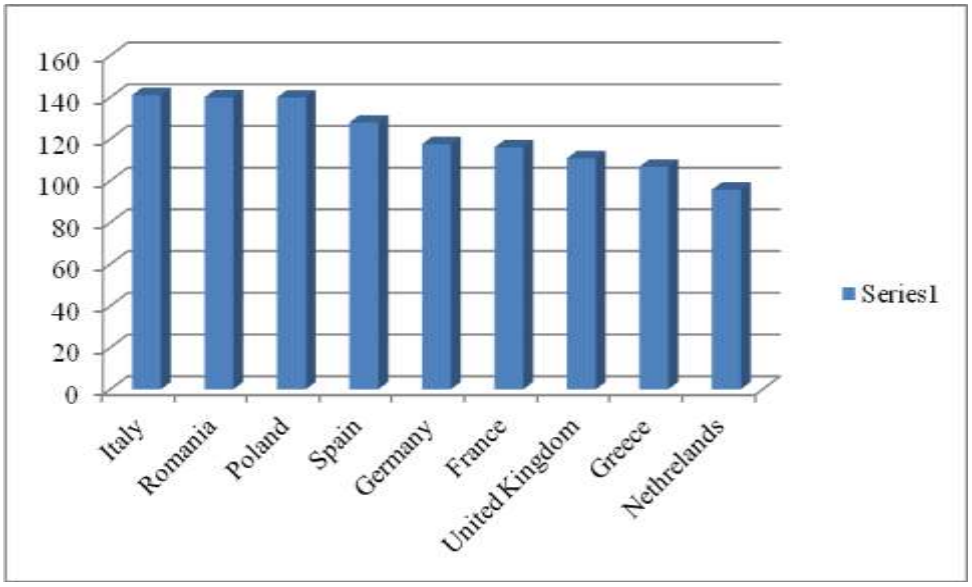

Fig. 6. Indicator A of the income from agriculture in Romania compared to the other EU selected countries in 2019 (2010 = 100)
Source: Own design based on the data from [9].

In 2020, it was continued the downward trend the labor force input being by -2.8 % less compared to 2019. The decline accounted for 5-6% in Romania, Slovakia, Lithuania, Portugal, Hungary, Bulgaria and Estonia, and slightly more than 8% in Spain.
In 2020, the EU's agricultural income expressed by real factor income per AWU fell slightly by -1.5 % compared to 2019.
In consequence, Factor income A declined by -4.2% in 2020 versus 2019. A slight decline was achieved in five EU largest seven agricultural producers: Italy (-4.9 %), the Netherlands (-5.1 %), France (-7.6 %), Romania (-13.8 %) and Germany (-14.6 %).
However, it is obviously, that the EU agricultural income per AWU was by 27.2 % higher in 2020 than the index level in 2010 [10].

3.12. Contribution of agriculture to GDP

In 2010, agriculture contributed by Euro 171.9 Billion to EU-27 GDP, that is by 1.3 % compared to 1.2 % in the year 2017 [10].

Regarding the contribution of agriculture to GDP in each analyzed country, the situation is the following one: Romania 4.1%, Greece 3%, Spain 2.4%, Poland 2.2%, Italy 1.8%, Netherlands 1.6%, France 1.2%, Germany 0.6%, United Kingdom 0.5% [1] (Fig. 1).

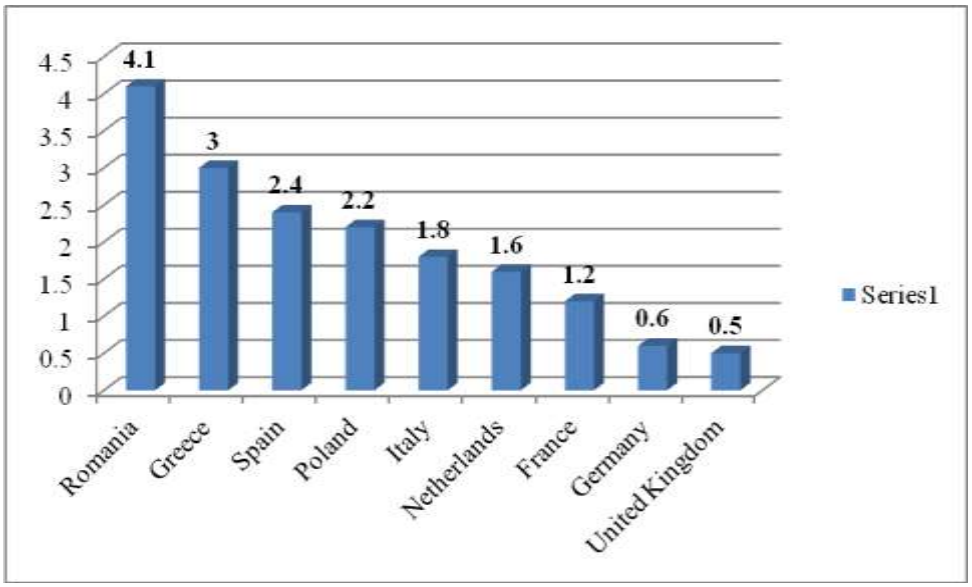

Fig. 7. Contribution of agriculture to GDP in Romania and the other selected EU countries (%)
Source: Own design based on the data from [1].

Conclusions

(1) Romania has proved to be among the most important EU countries dealing with agriculture during the period 2010-2020.

(2) Despite its highest number of small farms in the EU, dominated by family subsistence farms, it utilizes 12.5 million agricultural land, meaning 3.6 ha UAA per farm compared to 16.7 UAA the EU average. This puts Romania on one of the last positions in the EU next to Cyprus and Malta.

(3) For Euro 12,105 Million standard output, Romania comes on the 8th position in the EU after France, Italy, Germany, Spain, United Kingdom, Poland and Netherlands, but for only Euro 3,537 standard output per farm, Romania is situated on the last position in the EU.

(4) Carrying out Euro 18.9 Billion agricultural output in 2019, Romania contributed by 4.2% to the EU agricultural output and for this market share, it comes on the 8th position after France, Germany, Italy, Spain, United Kingdom, Netherlands, and Poland.

For crop output, it comes on the 6th position, contributing by 5.72% to the EU crop output, after France, Italy, Spain, Germany, and Netherlands. But for only Euro 3.92 Billion animal output, Romania has one of the smallest contribution of 2.2% to the EU and this because of the inbalanced crop/animal output ratio of 3.38.

(5) For Euro 8.78 Billion GVA in agriculture, Romania contributed by 4.56% to the EU GVA and was ranked the 8th among the selected member states.

(6) Compared to 2010, in 2019, income in terms of Indicator 1 from agriculture was by by 39.9% higher in Romania, being exceeded only by Italy which had +41.03%.

(7) The contribution of agriculture to Romania's GDP is enough high accounting for 4.1%, compared to Greece 3%, Spain 2.4%, Poland 2.2%, Italy 1.8%, Netherlands 1.6%, France 1.2%, Germany 0.6%, and United Kingdom 0.5%.

(8) Taking into account the situation regarding the development of agriculture and its contribution to the EU, for the next period of time, Romania has to continue the implementation of CAP being focused on the sustainable development of this sector to obtain a higher economic performance under a more balance use of resources, preservation of the environment factors and being much better adapted to the challenges of climate change.

(9) The development of agriculture depends on changes in farm structure based on setting up associative forms of production, on the assurance of a better technical endowment, a higher training level of the farmers, a higher level of farm inputs, a better production cost monitoring, on more gross value added along the product chain, on the increase of agricultural production value, standard output and the contribution of agriculture to the Romania's economic growth and participation in international trade.

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