

THE DYNAMICS OF THE AGRICULTURAL SECTOR IN ROMANIA BY NUTS 2 REGIONS

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Abstract

This paper analyses the evolution of the agricultural sector in Romania at the level of NUTS 2 Regions (Development Regions) in the period 2010-2020. The study of the farms' number evolution, the agricultural area used and the simple and derived indicators of agricultural performance are basic elements in characterizing this area of interest, identifying the most appropriate sectoral strategies and formulating the directions of action both by the agricultural policymakers and the farmers. The data required for the calculations were subtracted from the Eurostat platform and processed using graphical and tabular elements. The results identified the importance of the agricultural sector in Romania for the regions analyzed in relation to the European Union average, highlighting the dynamics of the number of farms, agricultural land use, labour productivity, economic size and production value. The analysis focuses on the regional level but makes connections and comparisons with the national and EU levels, the conclusions indicating the differences and explaining the trends.

Key words: agricultural sector, farm, agriculture dynamics, NUTS 2 Regions, agriculture performance

INTRODUCTION

Due to the large number of farms caused by the excessive fragmentation of agricultural land and the presence of traditional agriculture in subsistence and semi-subsistence farms, Romania is often seen as a country whose agricultural sector is inefficient. According to the data, the agriculture sector has experienced a noticeable and positive growth rate. The results and economic indicators reveal an improved level of performance in various areas, compared to the EU average. A substantial reduction in the number of farms means an increase in the share of large farms [4] and following the review and analysis of the literature, it was found that an increased interest in the cooperation in agriculture is developing in the last decades [21]. Considering the fact that the performance of agriculture is given by several determinants and particular factors that establish relationships of conditioning, complementarity or competitiveness [7] the data indicate the need to continue and

intensify efforts to modernize and improve efficiency in the agricultural sector in many regions of the EU [24], in particular by using dedicated financing instruments [5]. The results were reflected by the absolute and relative indicators that describe the growth in the scale of farming and agricultural output across the farming types [23], the basic unit for agriculture development being the farm. The farm, which consists of agricultural land, buildings, storage facilities, agricultural machinery and equipment, other outbuildings, livestock and poultry and associated utilities that support agricultural activities, is the fundamental economic unit for agricultural production [6]. Agriculture has become the major land use activity in the world and in Romania as well, farming becoming more intensive in order to raise productivity [22] even if this is not necessarily a sustainable solution for economic development [1]. Agricultural systems supply the national economy with several vital products and agricultural production differs in many

respects from other sectors of the economy in terms of the complexity of farming systems and methods, as well as the multiple correlations between the factors involved in the technological processes [3], agriculture representing the primary source of supply for the food processing industry [9] and, as one of the most important branch of the national economy, agriculture, is called upon to provide quantitatively and qualitatively raw materials for the food industry [26] even if it's contribution to GDP as at present in Romania, is still smaller compared to industry and services [19].

There are many farms in Romania and the European Union, with diverse agricultural activities that form a complex reality [2]. However, the current stage of development of Romanian agriculture shows a low level of agricultural production that is mostly dependent on the evolution of natural conditions [20]. Regional development in Romania has become one of the most important policy, because its actions affect an entire range of fields, including economic, social and environmental [25]. Regarding agriculture in general some regions in Europe are already highly dynamic, others are locked-in, and still others are struggling to stay viable and as a consequence major transformations are needed to address sustainability issues and policymakers should regionally differentiate their strategies [8].

In order to discover the best solutions based on the unique characteristics of each region's

agricultural sector and to generate a more detailed picture from the general to the particular, a regional approach to agriculture is required.

MATERIALS AND METHODS

Statistical data sources associated with EUROSTAT were used to illustrate the selected theme. Particular intermediate data series from 2010 to 2020 were used, with 2020 being the final year for which data were available for all the indicators examined.

In order to analyze and comprehend statistical indicators, it was necessary to determine the fundamental series and compute the relative difference between the final year and the first year of the series under consideration, as demonstrated by the results that were displayed in graphical and tabular form. An extensive characterization of the dynamics of the agricultural sector was made possible by calculating the derived indicators using the identified basic indicators, and a comparative analysis which revealed evolutionary gaps at the level of development region in Romania.

RESULTS AND DISCUSSIONS

The agricultural sector's dynamic value and percentage growth, as indicated by the Gross Domestic Product (GDP) for Romania (Table 1) highlights the sector's continued high importance when compared to the European Union average values.

Table 1. GDP (at current market prices) and share of Agriculture in GDP evolution for EU and Romania

Region	2010	2013	2016	2020
GDP (million euro)				
EU - 27 (from 2020)	10,980,485	11,516,211	12,548,706	13,461,156
	100.0	104.9	114.3	122.6
Romania	128,278.9	142,928.9	167,494.3	220,486.7
	100.0	111.4	130.6	171.9
Percentage of GDP represented by Agriculture, forestry and fishing (%)				
EU - 27 (from 2020)	1.6	1.7	1.6	1.6
	100.00	106.25	100.00	100.00
Romania	5.2	5.5	4.3	4.2
	100.00	105.77	82.69	80.77

Source: Own calculation using Eurostat Database [18].

Romania's GDP increased in 2020 related to 2010 with 49.3% more than the EU average, with GDP

per capita increasing by more than 60% (Table 2). During the period under review, the share of

agriculture in GDP fell by 19.23%, being in 2020 2.6 times higher than that of the EU even though in 2020 the level of GDP per capita was 2.6 times lower than the EU average.

Table 2. The GDP evolution (Euro/inhabitant) for NUTS 2 Regions

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	24,900	26,000	28,200	30,000	20.48
Romania	6,300	7,200	8,500	11,400	80.95
North-West	5,400	6,200	7,600	10,700	98.15
Center	5,800	6,700	8,100	10,900	87.93
North-East	3,700	4,500	5,200	7,500	102.70
South-East	4,800	6,400	7,100	9,000	87.50
South-Muntenia	4,900	5,700	6,800	8,600	75.51
Bucharest-Ilfov	14,300	16,800	19,900	26,200	83.22
South-West Oltenia	4,500	5,300	6,100	8,800	95.56
West	6,800	7,400	9,000	11,500	69.12

Source: Own calculation using Eurostat Database [17].

Since 2010 there have been significant increases for this economic indicator for all 8 NUTS 2 regions in Romania, the highest being 102.7% (North-East). The structural changes in Romanian agriculture impact the economy [10] through the purchase of land by foreigners [6], farms number or efficiency. At the European, national and regional levels, a

decrease in the number of farms can be identified (Table 3), which is, in fact, a positive element in the economic development and especially of agriculture, indicating a lower degree of fragmentation for the utilized agricultural areas and, obviously, a higher number of agricultural associations and cooperatives.

Table 3. NUTS 2 farms number (2010-2020)-thousands

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	12,055.3	10,650.7	10,270.6	90,67.3	-24.79
Romania	3,859.0	3,629.7	3,419.2	2,887.1	-25.19
North-West	528.5	499.9	478.1	443.1	-16.16
Center	394.7	358.5	330.6	318.5	-19.30
North-East	790.8	754.5	719.8	593.0	-25.01
South-East	460.3	433.0	409.9	324.1	-29.60
South-Muntenia	800.8	753.6	694.1	522.0	-34.82
Bucharest-Ilfov	33.5	25.3	21.0	17.2	-48.55
South-West Oltenia	576.6	557.9	539.2	466.5	-19.09
West	273.9	247.0	226.6	202.8	-25.97

Source: Own calculation using Eurostat Database [14].

The North-East Region accounts for 20.54% of all farming units, with South-Muntenia having the second-highest percentage at 18.08%. However, it should be noted that the structure of farms by development region does not serve as a major indicator of differentiation because each region has unique physical and geographical characteristics that directly influence the number of farms.

A country's agricultural sector has developed to a greater extent when the number of associative forms with high levels of technology and increased productivity

increases, which is shown by a decline in the number of farms.



Fig. 1. Evolution indices related to NUTS 2 average (%)
 Source: Own design based on the data from Eurostat [14].

Given that the Bucharest-Ilfov region is a smaller area with a substantially increasing urbanization index, it records the highest deviation (21.24%) compared to the national average percentage decrease in the number of farms, while the North-West region records the lowest value (Fig. 1).

Given the limitations of area, landform, and climatic conditions that can determine the practice of agricultural activity in a certain area, Utilized Agricultural Area (UAA) is an indicator that cannot show significant variations, nor can there be significant changes from one year to the next considering the current availability (Table 4).

Table 4. UAA evolution (2010-2020) - thousands ha

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	159,089.9	157,008	150,171	155,093	-2.51
Romania	13,306.1	13,055.9	11,016.5	12,762.8	-4.08
North-West	1,808.4	1,783.2	1,549.1	1,788.9	-1.08
Center	1,627.3	1,694.0	1,267.7	1,606.1	-1.30
North-East	1,940.2	1,937.1	1,698.0	1,834.0	-5.47
South-East	2,194.4	2,092.5	1,853.6	2,173.3	-0.96
South-Muntenia	2,333.7	2,251.0	1,932.4	2,283.3	-2.16
Bucharest-Ilfov	62.5	75.6	63.0	78.8	+26.10
South-West Oltenia	1,608.4	1,574.2	1,379.5	1,484.2	-7.72
West	1,731.4	1,648.4	1,273.2	1,514.3	-12.54

Source: Own calculation using Eurostat Database [11].

The data show a slight decrease in UAA for most of the development regions except Bucharest-Ilfov, while at the national level there is a decrease of 4.08%, 1.6 times the EU average. An indicator showing the efficiency

of agricultural land use and the degree of land aggregation in relation to existing farms is the UAA per farm, whose national level increase is close to the EU average (Table 5).

Table 5. UAA/farm evolution (2010-2020) - ha

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	13.20	14.74	14.62	17.10	+29.61
Romania	3.45	3.60	3.22	4.42	+28.21
North-West	3.42	3.57	3.24	4.04	+17.99
Center	4.12	4.73	3.83	5.04	+22.30
North-East	2.45	2.57	2.36	3.09	+26.06
South-East	4.77	4.83	4.52	6.71	+40.69
South-Muntenia	2.91	2.99	2.78	4.37	+50.11
Bucharest-Ilfov	1.86	2.98	3.00	4.57	+145.10
South-West Oltenia	2.79	2.82	2.56	3.18	+14.05
West	6.32	6.67	5.62	7.47	+18.14

Source: Own calculation using Eurostat Database [11, 14].



Fig. 2. UAA/farm distribution per NUTS 2 Regions in Romania

Source: Own design based on the data from Eurostat [11, 14].

Romania, the country with the largest number of farms in the EU, has managed to increase this indicator slightly from 3.45 ha/farm in 2010 to 4.42 ha/farm in 2020, even though it continues to possess the lowest value of the indicator.

From a regional point of view (Fig. 2), the highest values are recorded in 2020 in the West (7.47 ha/farm) and South-East (6.71 ha/farm) and the lowest value is for the North-East Region (3.09), which is less than half the value recorded in the West.

Out of a total of 2.887 million farms, Romania has only 16,010 over 100 hectares (5.5%) (Table 6) while in the EU this percentage is 3.6%.

Table 6. NUTS 2 Regions farms number per UAA category (2020) -ha

Region	Zero ha	Over 0 ha to less than 2 ha	From 2 to 4.9 ha	From 5 to 9.9 ha	From 10 to 19.9 ha	From 20 to 29.9 ha	From 30 to 49.9 ha	From 50 to 99.9 ha	100 ha or over
EU - 27 (from 2020)	126,500	3,733,420	1,925,520	1,121,510	789,040	341,690	353,530	349,630	326,470
Romania	45,570	2,042,630	519,440	161,020	56,200	18,160	16,890	11,150	16,010
North-West	1,800	264,950	115,760	39,770	11,590	2,950	2,680	1,840	1,730
Center	4,380	191,260	70,510	30,490	11,530	3,400	3,200	1,910	1,800
North-East	5,370	458,920	90,250	20,990	8,140	3,100	2,820	1,390	2,020
South-East	6,720	240,640	44,370	14,600	6,700	2,750	2,640	2,060	3,590
South-Muntenia	16,220	422,340	56,420	12,810	5,370	2,110	1,960	1,470	3,260
Bucharest-Ilfov	350	15,100	1,120	230	140	50	60	50	140
South-West Oltenia	8,630	334,910	93,130	19,540	4,920	1,480	1,370	870	1,660
West	2,110	114,510	47,880	22,590	7,810	2,340	2,160	1,560	1,810

Source: Eurostat Database [16].

For all levels of analysis, the 0-2 ha category had the highest weight in total (Fig. 3).

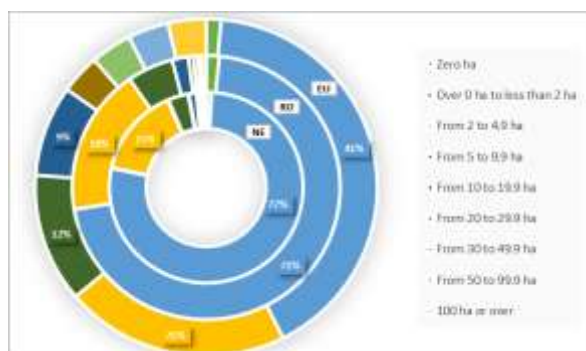


Fig.3. Farms number structure by UAA/farm (2020)

Source: Own design based on the data from Eurostat [16].

The segmentation group 0-4.9 ha has the biggest proportion at both the regional and national levels, accounting for 92% in the North-East Development Region, 88% in Romania, and 62% in the EU.

The group 5-19.9 ha, which accounts for 21% of the EU, makes up the difference; in Romania it represents just 8%, and in the North-East Region it represents 5%.

One crucial factor in the classification of farms is the economic size of the holding, which can be stated in either standard

Table 7. NUTS 2 Regions farms number by economic size (2020) – euro (S.O.)

Region	0	0-2,000	2,000-3,999	4,000-7,999	8,000-14,999	15,000-24,999	25,000-49,999	50,000-99,999	100,000-249,999	250,000-499,999	over 500,000
EU - 27 (from 2020)	75,640	3,345,990	1,353,950	1,172,660	842,290	547,230	591,690	445,010	398,640	175,290	118,910
Romania	28,280	2,064,190	395,920	215,790	90,140	38,640	29,270	12,910	7,520	2,580	1,850
North-West	7,500	288,340	69,090	44,610	18,330	7,240	4,930	1,890	780	210	150
Center	3,790	217,910	41,920	26,760	12,810	6,320	5,390	2,240	970	240	130
North-East	2,520	447,850	78,380	36,460	13,720	6,220	4,530	1,800	1,030	300	210
South-East	1,670	233,590	39,430	22,720	10,890	5,550	4,860	2,460	1,780	680	430
South-Muntenia	4,870	408,040	55,600	28,020	12,290	4,950	3,690	1,930	1,450	620	500
Bucharest-Ilfov	260	14,250	1,280	740	300	110	110	60	60	40	20
South-West Oltenia	3,220	327,050	80,250	35,830	11,680	3,890	2,410	1,120	660	220	170
West	4,450	127,160	29,970	20,650	10,120	4,360	3,350	1,410	790	270	240

Source: Eurostat Database [15].

According to the economic size study, which shows the standard value of agricultural production, Romania and the EU differ significantly in 2020. While the percentage of farms above 500,000 SO is 1.31% at EU level, in the same category Romania has only

0.06% of the total number of farms. Also at the national level, the 0-3,999 SO group makes up 85.21% of the total, whereas the share in the EU is just 51.83% (Fig. 4).



Fig. 4. Farms number structure by economic size (2020)
 Source: Own design based on the data from Eurostat [15].

Without a doubt, Romania's vast array of small farms exerts a substantial effect on the farms structure within the EU. At the regional level, 21.7% of the largest group (0-2,000 S.O.) is found in the North-East Region (Fig. 5). West Development Region holds the lowest proportion in this category, at 6.16%, a percentage that's 3.5 times lower than North-East Region, with the exception of Bucharest-Ilfov Region, that stands out due to particular features.



Fig. 5. Structure of farms by NUTS 2 Regions for the 0-2,000 S.O. category (%)
 Source: Own design based on the data from Eurostat [15].

In terms of economic size per farm, the dynamics of values show similar increases on the three levels (regional, national and European). From a value point of view, however, the differences are significant, Romania having an average economic size 9.47 times lower than the EU average, with the South-West Oltenia Region recording the lowest level, standing at 74.43% of the national average (Table 7).

Table 8. Economic size/farm (2010-2020) - euro (S.O)

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	23,855.9	29,039.1	33,018.9	39,677.4	+66.32
Romania	2,558.8	3,303.2	3,423.8	4,188.8	+63.70
North-West	2,399.6	3,168.9	3,295.4	3,745.7	+56.09
Center	2,836.1	3,831.1	3,932.9	4,530.7	+59.75
North-East	2,084.4	2,730.2	2,783.8	3,167.0	+51.93
South-East	3,642.5	4,569.2	4,799.2	6,271.4	+72.17
South-Muntenia	2,311.1	2,924.6	3,076.0	4,121.1	+78.32
Bucharest-Ilfov	2,881.6	3,619.8	3,751.5	4,013.8	+39.29
South-West Oltenia	2,092.0	2,602.4	2,662.2	3,118.0	+49.05
West	3,681.8	5,044.6	5,345.1	6,933.2	+88.31

Source: Own calculation using Eurostat Database [14, 15].

The labor force engaged in this fundamental activity that supplies food to the other economic sectors is another aspect of agriculture as a branch of the economy to be examined, in addition to the agricultural area and the number of farms. One representative indicator of analysis particular to the agricultural economy is the Annual Working Unit (AWU). Overall, during the time frame of the analysis, this indicator has consistently decreased (Table 9). This trend was brought by the mechanization and automation of

production processes, effective farm management, and, more recently, the digitalization of agriculture and the adoption of modern technologies.

The region that engages the most people in agricultural activity and generates the highest number of AWUs is North-East with a value of 258,790 AWUs in 2020 followed by South-Muntenia (189,600 AWUs). As an indicator of the agricultural economy with higher precision and accuracy, AWU per farm expresses how efficiently the labour force was

used, having a value of 0.41 AWU/farm for Romania in 2020, the highest value at the regional level being attributed to the South-East region with 0.46 AWU/farm (Table 10).

Table 9. AWU evolution - thousands (2010-2020)

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	9,648.9	9,381.8	8,813.6	:	-
Romania	1,417.9	1,573.1	1,587.6	1,178.6	-16.87
North-West	213.9	218.1	217.2	176.9	-17.30
Center	158.1	157.5	156.2	136.4	-13.73
North-East	314.0	336.8	346.5	258.7	-17.59
South-East	179.1	196.9	203.7	149.9	-16.30
South-Muntenia	243.5	281.3	276.2	189.6	-22.15
Bucharest-Ilfov	13.1	12.2	12.7	7.1	-45.27
South-West Oltenia	193.7	252.7	271.9	168.4	-13.04
West	102.3	117.4	102.9	91.3	-10.72

Source: Own calculation using Eurostat Database [12]; : - missing data.

Table 10. AWU/farm (2010-2020) - ha

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	0.80	0.88	0.86	:	-
Romania	0.37	0.43	0.46	0.41	+11.11
North-West	0.40	0.44	0.45	0.40	-1.36
Center	0.40	0.44	0.47	0.43	+6.91
North-East	0.40	0.45	0.48	0.44	+9.90
South-East	0.39	0.45	0.50	0.46	+18.89
South-Muntenia	0.30	0.37	0.40	0.36	+19.44
Bucharest-Ilfov	0.39	0.48	0.61	0.42	+6.38
South-West Oltenia	0.34	0.45	0.50	0.36	+7.48
West	0.37	0.48	0.45	0.45	+20.59

Source: Own calculation using Eurostat Database; : - missing data [12, 14].

One factor that could influence the success of the agricultural industry as a whole is the degree of technical endowment highlighted by the Gross Fixed Capital Formation (GFCF). During the analysis period, both at the national and EU levels, the value of sector-

specific buildings and agricultural machinery and equipment grew (Table 11). According to development regions, the Center Region witnessed the biggest gain in 2020 compared to 2020 (116.91%), while the West Region suffered the greatest decline (-29.17%).

Table 11. GFCF evolution (2010-2020) - mil. euros

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	47,807.3	51,253.7	48,690.8	56,009.2	+17.16
Romania	1,115.65	1,309.68	964.25	1,266.16	+13.49
North-West	207.22	219.81	160.98	151.57	-26.86
Center	152.48	163.08	131.67	330.74	+116.91
North-East	193.93	170.41	141.88	139.98	-27.82
South-East	138.54	250.58	144.05	122.36	-11.68
South-Muntenia	168.07	277.81	137.68	235.22	+39.95
Bucharest-Ilfov	40.16	9.62	92.99	47.67	+18.70
South-West Oltenia	112.11	114.87	67.65	165.56	+47.68
West	103.14	103.51	87.36	73.05	-29.17

Source: Own calculation using Eurostat Database [13].

For the two branches of agriculture (animal output and crop output) at the national level in 2020 the ratio was 1:3.8 while for the EU the same ratio was 1:2.5. Total agricultural output dynamics in 2020 related to 2010 show an

increase in all regions of the country except the South-East Region. The maximum value characterizes the South-Muntenia Region with 2,748.49 million euro (Table 12).

Table 12. Agricultural output dynamics (2010-2020) - mil. euros

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	336,350.6	383,177.8	365,774.5	400,080.2	+18.95
Romania	14,092.3	16,260.6	14,036.0	15,341.3	+8.86
North-West	1,807.0	1,899.1	1,721.6	2,095.1	+15.94
Center	1,683.5	1,786.8	1,555.0	1,796.6	+6.72
North-East	2,298.4	2,650.5	2,143.6	2,436.5	+6.01
South-East	2,252.4	2,773.0	2,518.3	2,093.6	-7.05
South-Muntenia	2,575.7	3,295.5	2,768.4	2,748.4	+6.71
Bucharest-Ilfov	160.6	232.9	183.4	293.9	+82.96
South-West Oltenia	1,579.1	1,778.1	1,567.3	2,064.6	+30.74
West	1,735.2	1,844.4	1,578.1	1,812.2	+4.44

Source: Own calculation using Eurostat Database [13].

The animal husbandry sector (taken separately) displays a similar regional tendency; however, the North-East Region holds the highest share, with 734.64 million

euros, while the Bucharest-Ilfov Region holds the lowest value, with 19.55 million euros (Table 13).

Table 13. Animal output dynamics (2010-2020) - mil. euros

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	131,726.1	156,076.2	145,358.2	158,498	+20.32
Romania	3,635.65	3,907.61	3,779.74	4,047.46	+11.33
North West	536.09	554.65	521.07	558.21	+4.13
Center	517.32	552.87	548.01	599.17	+15.82
North-East	640.55	682.22	679.08	734.64	+14.69
South-East	461.98	554.43	567.15	550.07	+19.07
South-Muntenia	651.12	672.38	643.99	639.99	-1.71
Bucharest-Ilfov	38.78	27.98	23.97	19.55	-49.59
South-West Oltenia	333.74	365.21	346.21	390.49	+17.00
West	456.09	497.86	450.25	555.33	+21.76

Source: Own calculation using Eurostat Database [13].

Finally, the most relevant indicator for comparison in terms of agricultural economics is agricultural output/farm, which in Romania, although increasing by 73.85% (from 2010 to

2020), is 6.2 times lower than the EU level as a whole (Table 14), mainly due to the high number of subsistence farms.

Table 14. Agricultural output/farm (2010-2020) - thousands euros

Region	2010	2013	2016	2020	%2020/2010
EU - 27 (from 2020)	27.90	35.98	35.61	44.12	+58.15
Romania	4.07	5.37	5.00	7.08	+73.85
North West	3.42	3.80	3.60	4.73	+38.29
Center	4.27	4.98	4.70	5.64	+32.24
North-East	2.91	3.51	2.98	4.11	+41.37
South-East	4.89	6.40	6.14	6.46	+32.04
South-Muntenia	3.22	4.37	3.99	5.27	+63.72
Bucharest-Ilfov	4.80	9.20	8.73	17.06	+255.62
South-West Oltenia	2.74	3.19	2.91	4.43	+61.59
West	6.34	7.47	6.96	8.94	+41.07

Source: Own calculation using Eurostat Database [13, 14].

The Bucharest-Ilfov Region, the most developed area in the country, is distinguished

regionally in 2020 due to its lower number of farms, more effectively integrated use of

capital injection and cutting-edge farming technologies. Apart from Bucharest-Ilfov Region (with an increase of 255.62%), the most significant increases belonged to South-Muntenia Region (with an increase of 63.72% in 2020 compared to 2010) and South-West Oltenia Region (+61.59%).

With 8.94 thousand euros, the West Region is the only region that still exceeds the national average of 7.08 thousand euros for this indicator (Fig. 6).



Fig. 6. Graphical comparison between regional/farm agricultural production value and the national average (2020) - thousands of euros

Source: Own design based on the data from Eurostat [13, 14].

CONCLUSIONS

Given the global climate change and technological advancements, analysis of the factors that contribute to efficient agriculture is crucial. Farm management and national agricultural policymakers must address these evolving challenges.

A top-to-bottom approach to developments (for the present work from the EU to national level and then by NUTS 2 Regions) can generate results that can be integrated into regional agricultural development policies.

The comparative analysis of the situation in the last year of analysis (2020) as well as the evolution of the indicators in the first year of analysis (2010) shows that Romania and the NUTS 2 region are experiencing significant positive changes in terms of agricultural

performance and increasing the efficiency of inputs use in this sector.

The paper complements the national studies on the state and dynamics of agriculture with more detailed research with a regional approach without losing sight of developments at the country or EU level.

The main discrepancies between the regional or national situations of agriculture and the EU-wide average were reflected by the UAA/farm indicators (given that Romania has the highest number of farms in the EU, with an average of 4.42 ha/farm), but there were significant decreasing trends in the number of farms in each region, with the national average exceeding 25%. This decrease was accompanied, consequently, by an increase in economic size per farm in 2020 compared to 2010 of 63.7%.

The decrease in the number of AWUs and the increase in GFCF as effects of the increasing integration of new technologies and innovations in the fields have led to an increase in yield and the value of total production, with the lowest increase in the South-East region (+32.04), while in Romania the increase is 73.85 and in the EU-27 (from 2020) 58.15 %.

The study is focused on Romania's NUTS 2 regions, but it can be broadened to encompass all the EU's NUTS 2 regions. Future research initiatives should focus on regional comparisons across various Member States, as well as analogous worldwide evaluations.

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