

STUDY ON THE CHARACTERISTICS OF THE VEGETAL AGRICULTURAL SECTOR IN ROMANIA COMPARED TO OTHER EU COUNTRIES

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Abstract

This paper proposes a detailed analysis of the performance of the Romanian vegetable agricultural sector, compared to the EU average, for the period 2018-2022. The aim of the paper is to highlight the relative position of Romania within the vegetable agricultural sector, by assessing some indicators that reflect the economic performance and competitive capacity of the sector. The research method was based on the analysis of certain technical-economic indicators such as: average farm size, agricultural area in relation to population, average production per hectare, income from the agricultural sector and productivity. The analysis was based on official statistical data provided by national and European reference institutions such as Eurostat, the National Statistical Institute and the Ministry of Agriculture and Rural Development. The results obtained show that Romania consistently ranks among the top six EU Member States in terms of crop production. From the point of view of economic performance, the values recorded by the Romanian agricultural crop sector are comparable with the EU average.

Key words: agriculture, vegetable sector, potential, performance, productivity, Romania

INTRODUCTION

The agricultural sector plays an important role in Romania's economy. It represents 3,8 percent of national GDP and 18,45 percent of employment (Bodescu et al., 2021) [3]. The crop sector, through the cultivation of cereals and oilseeds, is an important source of food and raw materials for the food industry (Burja et al., 2020) [2].

In a context marked by intensifying climate change, profound economic transitions and constant redefinition of the European agricultural policy framework, the analysis of the performance of the vegetable sector is of a particular strategic relevance (Popescu et al., 2023a) [12].

The issue is at the confluence of multiple interests: academic, institutional and practical, generating a complex framework of reflection and intervention for researchers, policy makers and farmers alike.

In this respect, understanding the dynamics of plant sector performance is not just a descriptive approach but a prerequisite for

sustainable and competitive agricultural policies at European Union level

The literature highlights that the performance of the plant sector is influenced by factors such as: the structure of agricultural holdings, access to finance, the use of modern technologies and climate change (Andrei, 2019) [1]. Also, the analysis carried out by Eurostat, 2022, indicates that Romania, although it has an extensive agricultural area, has lower yields compared to other member states of the European Union [5].

In Romania, some researchers Jurjescu et al. (2020), Medelete et al. (2018), Panzaru and Medelete (2017, Popescu et al., 2023b [6, 7, 10, 11] pointed out that the main agricultural crops which dominate the vegetal sector are: maize, wheat and sunflower

At the beginning of the Common Agricultural Policy in 1962, farmers were encouraged to adopt measures of agricultural intensification by using large quantities of pesticides and fertilizers. These measures were aimed at increasing yields to achieve the European Union's strategic objectives of food self-sufficiency (Coca et al., 2020) [4]. The agricultural sector in Romania plays a very

important role in the national economy and can represent a real source of competitive advantage within the European Union. This potential is supported by natural resources available, the extensive agricultural area and the growing number of specialists in the field (Ștefan & Coca, 2013) [13].

The study analyzes the performance of the agricultural vegetable in Romania sector in relation to the standards and developments in the European Union, using relevant technical and economic indicators. The research highlights the factors influencing productivity, the main structural challenges and development opportunities for the sector. Based on the results obtained, applied recommendations and align the sector with the current requirements of European agricultural policies.

MATERIALS AND METHODS

The purpose of this paper is to analyse the performance of the Romanian vegetable agricultural sector. The present study is based on the processing of relevant statistical data and consultation of specialized literature. This approach aims to provide a perspective that reflects the quantitative dimension of the agricultural phenomenon, its structural and contextual particularities. The data used in the research were processed from Eurostat [5] database for European level indicators, statistical data published by the National Institute of Statistics [9] for detailed data on national agricultural as well as data provided by the Ministry of Agricultural and Rural Development [8]. In addition to these sources, relevant scientific works were consulted to support a deeper understanding of the sector analysed.

The research methods applied were the following:

- Descriptive statistical analysis – used to analyze the evolution of cultivated areas, the distribution of the main crops and the variations in average production per hectare

- Comparative analysis – aimed at placing the performance of the Romanian agricultural sector in a European context, by comparing it with indicators from other European Union member states and identifying possible gaps in terms of efficiency and productivity.

By using these methods, this paper contributes to creating an overview of the current state of the Romanian plant sector.

RESULTS AND DISCUSSIONS

Utilized agricultural area is an important indicator for assessing a country's agricultural potential. The size of this area directly influences agricultural production and the competitiveness of the agri-food sector.

Comparative analysis of the agricultural area used in the EU Member States provides information about the differences between countries in terms of the organization and use of agricultural land. Romania is one of the countries with a large agricultural area, which is an advantage in terms of available resources, but also entails the responsibility for their efficient management. (Table 1) provides an overview of the agricultural area utilizes in the European Union and shows Romania's position in relation to the other Member States. During the analysed period, the total useful agricultural area in the European Union varied between 161.9 million hectares and 160.5 million hectares. In dynamics, the trend is decreasing. During this period, the total arable agricultural area decreased by 1,387,650 hectares (-0,86%). The causes of the decrease are the conversion of agricultural land into residential or industrial areas and soil degradation due to the effects of climate change.

In 2022, the largest useful agricultural areas were recorded in: France - 28 million hectares, Spain - 24 million hectares, Germany - 16 million hectares, Poland - 14 million hectares, Italy 12.9 million hectares, Romania 12.6 million hectares, Greece – 5,3 million hectares, Bulgaria 5.02 million hectares.

Table 1. Utilized agricultural area at European Union level (ha)

Country	2018	2019	2020	2021	2022
Austria	2,653,840	2,652,220	2,646,960	2,602,490	2,599,510
Belgium	1,356,080	1,358,700	1,367,080	1,368,310	1,361,910
Bulgaria	5,030,280	5,037,470	5,047,250	5,046,600	5,022,060
Cyprus	132,440	125,350	127,780	121,780	122,790
Croatia	1,485,650	150,450	1,506,210	1,476,350	1,447,920
Denmark	2,632,500	2,626,000	262,000	2,618,400	2,624,250
Estonia	981,830	984,670	985,460	986,670	986,210
Finland	2,271,900	2,273,800	227,000	226,800	2,266,400
France	29,020,160	28,689,860	28,697,570	28,697,570	28,597,500
Germany	16,645,100	16,666,000	16,595,000	16,591,500	16,594,900
Greece	5,288,050	5,153,380	5,267,520	5,204,090	5,371,560
Ireland	4,516,040	4,524,150	4,511,420	4,337,130	4,347,530
Italy	12,908,750	13,150,200	13,122,140	12,987,420	12,950,410
Latvia	1,937,900	1,959,400	196,900	1,970,100	1,970,400
Lithuania	2,947,230	2,974,990	2,942,780	1,937,470	2,911,300
Luxembourg	131,560	131,590	132,140	132,810	132,520
Malta	11,580	11,580	10,700	10,730	107,30
Netherlands	1,822,400	1,816,320	1,814,450	1,811,910	1,804,370
Poland	14,539,550	14,550,350	14,754,860	14,521,860	14,197,890
Portugal	3,752,980	3,966,670	3,970,410	3,981,220	3,935,910
Czech Republic	3,523,220	3,523,660	3,523,870	3,529,800	3,530,420
Romania	13,413,740	13,825,610	13,048,800	13,078,880	12,677,580
Slovakia	1,919,540	1,915,730	1,910,040	1,856,130	1,849,190
Slovenia	477,930	479,820	484,060	479,490	479,430
Spain	24,201,910	24,371,660	24,434,630	24,420,400	24,692,570
Sweden	300,390	3,004,780	3,005,540	3,002,910	2,995,180
Hungary	5,343,780	5,309,520	4,997,880	5,049,010	5,081,050

Source: processed based on the data from Eurostat [5].

In 2022, Romania ranks 6th compared to the European Union states. The useful agricultural area in Romania decreased by 5,8% during the analysis period.

The arable agricultural area has a direct impact on the production of basic crops such as wheat, maize, sunflower (Table 2). In dynamics, the trend is decreasing. In 2018, the total arable agricultural area was 9.01 million hectares. In 2022, the total agricultural area decreased to 7.72 million hectares. The total arable agricultural area during this period decreased by 1,790,940 million hectares. The causes of the decrease are conversion of arable land into permanent pastures or forest areas, soil erosion and desertification effect due to climate change.

In 2022, the largest arable agricultural areas were recorded in: France – 17.04 million hectares, Spain – 11.69 million hectares, Germany – 11.65 million hectares, Poland 11.1 million hectares, Romania (8.21 million

hectares), Italy (7.01 million hectares), Hungary (4.15 million hectares).

In 2020, the number of farms in the European Union was 9,070,980 million with an uneven distribution between countries. Some countries have many farms: Romania 2,887,070 farms, Poland 1,302,330 farms, Italy 1,133,020 farms, Spain 914,870 farms, Greece 530,750 farms (Figure 1).

Other countries such as Germany, Denmark and the Netherlands have a consolidated agricultural system with a small number of farms. Romania had the highest number of farms in the European Union 2 times more than Poland - the country that ranks 2nd. The very large number of subsistence and small farms in Romania indicates that Romanian agriculture is fragmented. Romanian agriculture is dominated by small farms, farms that have a low performance, which limits competitiveness on the European Union market. Land fragmentation is one of the main problems of agriculture in Romania.

Table 2. Arable agricultural area at the European Union level (ha)

Country	2018	2019	2020	2021	2022
Austria	1,327,150	1,325,530	1,321,710	1,322,920	1,320,590
Belgium	856,830	863,550	869,340	870,420	868,410
Bulgaria	3,463,670	3,462,110	3,478,010	3,478,750	3,456,140
Cyprus	104,540	96,400	99,390	93,470	93,860
Croatia	803,900	822,810	888,930	856,740	851,470
Denmark	2,389,800	2,394,400	2,369,300	2,357,950	2,382,880
Estonia	679,150	685,940	685,940	693,640	698,880
Finland	2,242,600	2,244,900	2,242,700	2,242,800	2,240,800
France	18,229,910	18,210,620	17,044,030	17,072,010	17,045,660
Germany	11,730,900	11,713,700	11,663,800	11,657,900	11,657,000
Greece	1,849,640	1,815,810	1,764,950	1,753,140	1,755,180
Ireland	449,940	441,780	442,900	434,940	445,200
Italy	6,722,140	6,914,140	6,908,710	6,905,950	7,011,150
Latvia	1,294,800	1,318,600	1,333,500	1,362,200	1,356,700
Lithuania	2,113,280	2,209,900	2,247,330	2,277,030	2,290,440
Luxembourg	62,280	62,140	62,320	62,710	62,310
Malta	9,230	9,230	7,770	7,780	7,780
Netherlands	1,020,790	1,011,100	1,004,830	1,003,450	1,003,750
Poland	11,009,210	11,054,840	11,149,640	11,078,760	11,164,920
Portugal	960,440	997,760	972,910	967,770	932,560
Czech Republic	2,489,990	2,490,110	2,489,780	2,480,940	2,484,910
Romania	8,685,630	8,966,310	8,482,860	8,587,740	8,210,720
Slovakia	1,347,770	1,349,060	1,346,050	1,326,480	1,322,970
Slovenia	172,980	174,200	175,560	175,270	176,710
Spain	12,125,530	12,023,570	11,869,700	11,732,660	11,690,560
Sweden	2,541,990	2,540,120	2,242,700	2,242,800	2,240,800
Hungary	4,333,700	4,309,640	4,101,770	4,141,840	4,159,810
Total	99,017,780	99,508,260	97,569,970	97,494,560	97,226,840

Source: processed based on the data from Eurostat [5].

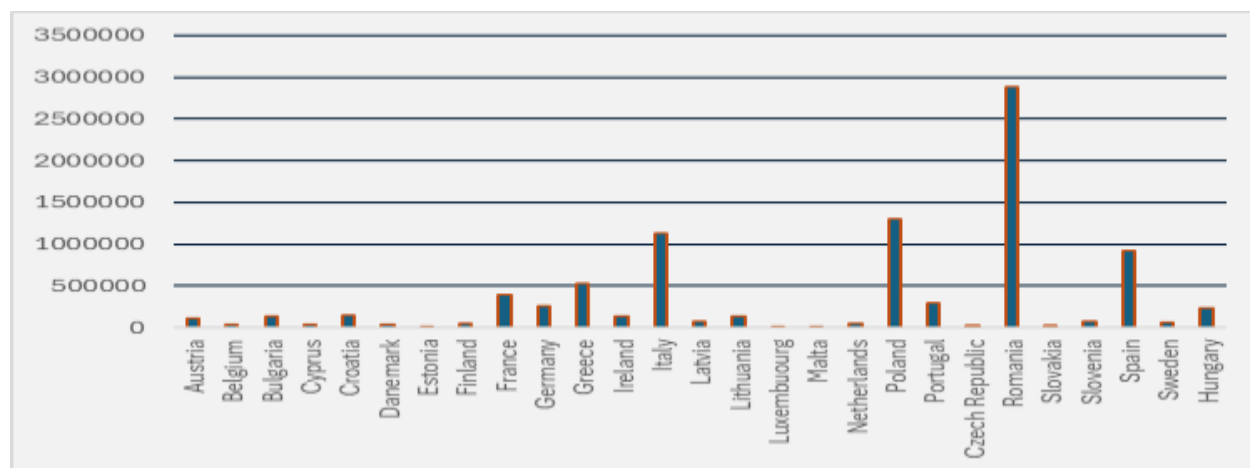


Fig. 1. Number of farms in the European Union in 2020 [5].
Source own results.

In this sense, decision-makers must adopt land consolidation policies and support for farmers association.

Western European countries have fewer farms, but they have a large area, are technologically efficient and economically efficient. Increasing the size of farms will make Romania a European leader not only in the number of farms, but also in economic efficiency.

The size of the agricultural holding, expressed in terms of the area of land under management, is a benchmark for analysing the performance of the agricultural sector and is correlated with the level of efficiency and productivity. Within the European Union, there is a wide variation in average farm size. The differences are due to the configuration of land tenure, the degree of technological modernization and agricultural regulations specific to each Member State.

According to 2020 data, the average farm size ranges from 1.02 hectares in Malta to 86.12 hectares in the Czech Republic (Figure 2). This consistent difference emphasizes the grouping of EU countries into two categories:

-Countries with large, technological farms, oriented towards economic efficiency and performance.

-Countries with small, fragmented farms based on subsistence agriculture.

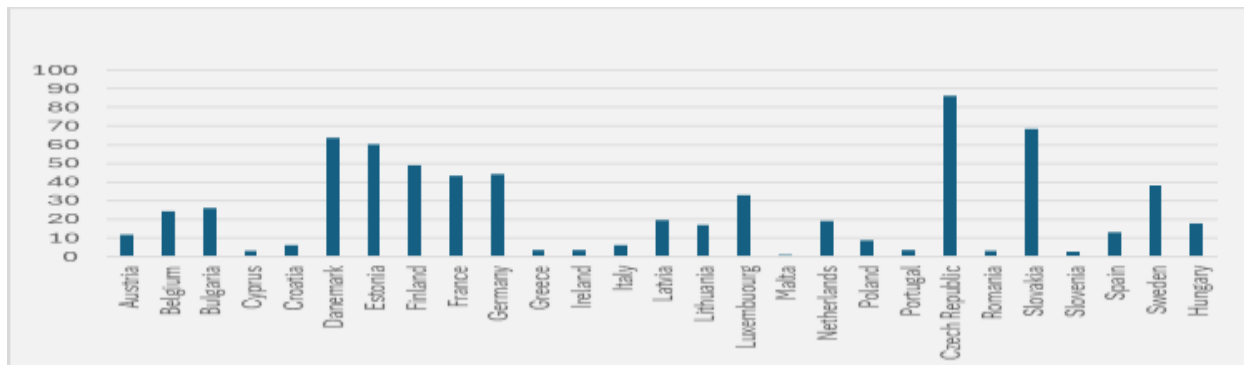


Fig. 2. Number of hectares/farm in the EU in 2020 [5].
Source: own results.

Among the countries of the European Union, a difference can be noted regarding the average farm size. The highest average areas per farm are found in the Czech Republic (86.12 ha/farm), Slovakia (68.57 ha/farm), Denmark (63.88 ha/farm), Estonia (60.33 ha/farm) and Finland (49.15 ha/farm).

At the opposite pole, the smallest farm sizes are found in Malta (1.02 ha/farm), Slovenia (2.42 ha/farm), Cyprus (2.92 ha/farm), Romania (2.94 ha/farm), and Greece (3.33 ha/farm). Romania is among the states with the smallest areas of farms. This area is 29 times smaller than in the Czech Republic and 21 times smaller than in Denmark.

The arable land area to population ratio is an indicator that describes a country's agricultural potential. This indicator is influenced by the size of the total arable area and the number of people residing in the country. At the EU level, during the period analysed, there is a general trend of decreasing arable area per capita. According to the data for 2022 (Table 3), the countries with the highest values of arable area per capita were recorded in: Lithuania has 0.81 ha/capita, Latvia has 0.72 ha/capita, Bulgaria has 0.53 ha/capita, Estonia has 0.52 ha/capita, Denmark has 0.40 ha/capita

Table 3. Arable area/capita in the EU (ha/capita)

Country	2018	2019	2020	2021	2022
Austria	0.15	0.14	0.14	0.14	0.14
Belgium	0.07	0.07	0.07	0.07	0.07
Bulgaria	0.51	0.52	0.52	0.53	0.53
Cyprus	0.12	0.11	0.11	0.10	0.10
Croatia	0.20	2.06	2.25	0.22	0.22
Denmark	0.41	0.41	0.40	0.40	0.40
Estonia	0.51	0.51	0.51	0.52	0.52
Finland	0.40	0.40	0.40	0.40	0.40
France	0.27	0.27	0.25	0.25	0.25
Germany	0.14	0.14	0.14	0.14	0.14
Greece	0.17	0.16	0.16	0.16	0.16
Ireland	0.09	0.08	0.08	0.08	0.08
Italy	0.11	0.11	0.11	0.11	0.11
Latvia	0.66	0.68	0.69	0.71	0.72
Lithuania	0.74	0.78	0.79	0.80	0.81
Luxembourg	0.10	0.10	0.09	0.09	0.09
Malta	0.01	0.01	0.01	0.01	0.01
Netherlands	0.05	0.05	0.05	0.05	0.05
Poland	0.28	0.29	0.29	0.29	0.30
Portugal	0.09	0.09	0.09	0.09	0.08
Czech Republic	0.23	0.23	0.23	0.23	0.23
Romania	0.44	0.46	0.43	0.44	0.43
Slovakia	0.24	0.24	0.24	0.24	0.24
Slovenia	0.08	0.08	0.08	0.08	0.08
Spain	0.25	0.25	0.25	0.24	0.24
Sweden	0.25	0.24	0.21	0.21	0.21
Hungary	0.04	0.44	0.42	0.42	0.43

Source: processed based on the data from Eurostat [5].

These countries have a relatively small population, a large agricultural area and agriculture plays an important role in the economy (export). The countries with the lowest arable areas per capita (2022) are: Malta 0.01 ha/capita, Netherlands 0.05 ha/capita, Belgium 0.07 ha/capita, Slovenia 0.08

ha/capita, Ireland 0.08 ha/capita. These countries are characterized by a dense population, limited agricultural areas, most of the land being used for industry and urbanization, the lack of an extensive area is compensated by the technology of farms achieving large productions per hectare.

Romania is in an average position in the European Union. During the analyzed period Romania recorded the following values: 2018: 0.44 ha/capita, 2019: 0.46 ha/capita, 2020: 0.43 ha/capita, 2021: 0.44 ha/capita, 2022: 0.43 ha/capita.

Wheat is an important agricultural culture both in Romania and in the European Union.

The evolution of the cultivated area in the analyzed period is increasing. In 2018, the agricultural area cultivated with wheat was 445 million hectares. In 2024, the agricultural area cultivated with wheat was 447 million hectares (Table 4) The countries with the largest wheat areas in 2022 are: Germany 2,980,900 ha,

Poland 2,518,440 ha, Spain 2,172,700 ha, Romania 2,168,660 ha and Italy 1,778,730 ha. All these countries have a favourable climate for wheat cultivation, with fertile soils. In these countries there is a high demand for wheat flour products.

These data reflect the importance of wheat in national and European agriculture, underlining the essential role in ensuring food security but also in the national and European economy.

The total area devoted to maize in the European Union has shown a downward trend over the period analysed. This change is caused by restructuring in the crop sector influenced by factors such as: climate change, market orientation, agricultural policies, crop rotation. According to the data of 2019, the area planted with corn in the countries of the European Union was 9.81 million hectares while in 2022 it decreased to 8.83 million hectares. The differences from 2019 to 2022 were about 980,000 hectares(Figure 3).

Table 4. Area cultivated with wheat in the European countries (ha)

Country	2018	2019	2020	2021	2022
Austria	294,290	278,340	279,020	279,860	295,510
Belgium	195,690	203,760	194,660	209,180	204,460
Bulgaria	1,212,010	1,198,680	1,200,180	1,206,190	1,506,580
Cyprus	10,020	10,590	12,970	12,320	13,310
Croatia	138,460	143,150	147,840	147,390	161,830
Denmark	425,800	573,400	502,600	537,700	497,300
Estonia	154,580	166,980	168,040	180,000	1,800,970
Finland	177,800	197,600	198,800	212,400	219,640
France	5,234,090	5,244,250	4,519,780	5,276,730	494,840
Germany	3,036,300	3,118,100	2,835,500	2,939,000	2,980,900
Greece	404,490	350,490	355,880	411,010	412,490
Ireland	579,80	63,480	46,990	62,330	67,230
Italy	1,821,730	1,754,640	1,711,220	1,726,610	1,776,730
Latvia	417,200	492,700	498,200	537,300	537,500
Lithuania	772,890	895,760	893,510	994,170	945,720
Luxembourg	12,870	13,360	11,930	12,870	13,570
Malta	0	0	0	0	0
Netherlands	111,660	120,550	108,910	118,140	123,800
Poland	2,417,230	2,511,330	2,391,000	2,390,520	2,518,440
Portugal	27,030	28,530	30,140	28,660	31,050
Czech Republic	819,690	839,450	798,580	784,780	854,430
Romania	2,116,150	2,168,370	2,155,250	2,175,080	2,168,660
Slovakia	403,370	406,820	387,080	356,970	411,690
Slovenia	27,820	26,730	27,290	26,790	275,60
Spain	2,063,680	1,920,090	1,914,660	2,128,470	2,172,700
Sweden	372,500	469,490	449,170	479,130	461,570
Hungary	1,026,150	1,015,640	936,620	892,790	9790,10

Source: processed based on the data from Eurostat [5].

This decrease in area is caused by severe drought in some regions (corner is sensitive to

lack of rainfall), alternation with other crops (some farmers have reduced areas cultivated

with maize in favour of wheat and oilseed plants with higher profitability), European Union agricultural policies

Countries with the largest areas cultivated with maize in 2022: Romania (2.43 million hectares), France (1,45 million hectares), Poland (1.19 million hectares), Hungary (816,640 hectares), Italy (563,700 hectares). Romania is the European leader in the area cultivated with corn.

In Romania, the area planted with maize has been constant during the analysed period 2018-2022 with very small fluctuations.

The recorded statistical data indicate the following values: in 2018- 2.44 million hectares were cultivated, which increased to 2.58 million hectares.

In the year 2021- 2.55 million hectares were recorded while 2.43 million hectares were cultivated in 2022.

This stability in the area cultivated with corn underlines the importance of this crop in Romanian agriculture.

Even if Romanian is in first place in the European Union in terms of area planted with maize, it is not the leader in total production.

Western European countries have higher production per hectare due to the use of advanced technologies and the irrigation system.

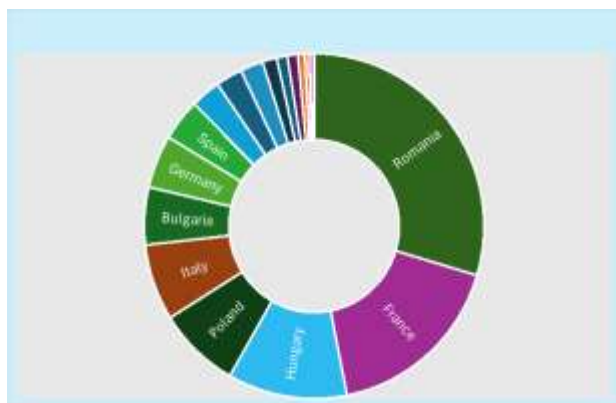


Fig. 3. Area cultivated with corn in 2022 [5].
Source: own results.

Romania needs to increase investment in irrigation infrastructure mechanization and technology. Investment in these areas will increase yields per hectare, reduce dependence on climatic factors and modernize the agricultural system.

The total area cultivated with sunflower in the European Union increased significantly in the analysed period. In 2018, the total area cultivated with maize was 4.02 million hectares. In 2022, the total area cultivated with sunflower was 4.93 million. (Figure 4). In dynamics growth was 18.35%. The factors that influenced the growth of the sunflower area were: high demand for sunflower oil, increased drought tolerance and European agricultural policies. The countries that had significant increases in sunflower area in 2022 compared to 2021 were: Spain (245,510 hectares), France (172,200 hectares), Bulgaria (80,490 hectares), Germany (43,300 hectares).

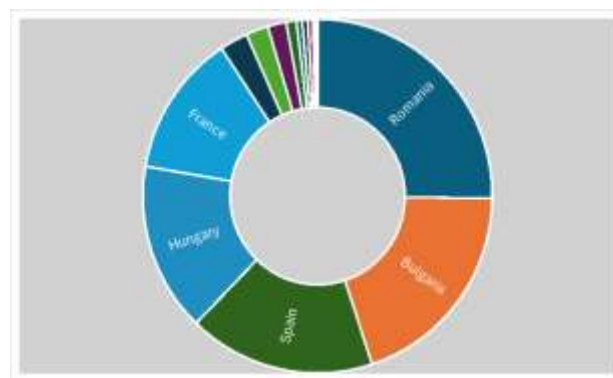


Fig. 4. Area cultivated with sunflower in 2022 [5].
Source: own results.

During the analysed period, Romania was the European Union leader in terms of sunflower area. In the years 2020 and 2022, the cultivated areas were smaller, negatively influenced by unfavourable climatic conditions and increased production costs. These decreases were largely because of the Covid-19 pandemic and the instability generated by the military conflict in Ukraine. The war affected supply chains and pushed up prices for fuel, fertilizers and seeds. **Total crop sector production in the European Union** in 2018 was 218.3 billion euro. In 2022 total crop sector production was 290.2 billion euro (Table 5). In dynamics the trend is increasing 12.66%.

The evolution of the agricultural sector in Romania:

2018 - €13.15 million (5th place in the EU)
2019 - €13.26 million (6th place in the EU)
2020 - €10.91 million (7th in the EU)
2021 - €15.02 million (6th place in the EU)
2022 - €14.58 million (7th place in the EU).

Table 5. Production vegetables sector at basic prices (million euro)

Country	2018	2019	2020	2021	2022
Austria	3,174,320	3,157,640	3,289,560	4,031,880	5,060,750
Belgium	3,640,380	3,926,100	4,047,010	4,934,720	4,934,720
Bulgaria	2,882,070	2,880,510	2,678,210	4,146,820	4,959,480
Cyprus	273,820	285,920	279,670	291,110	324,530
Croatia	1,397,660	1,396,590	1,434,110	1,620,710	1,963,450
Denmark	3,510,280	3,758,230	4,000,920	4,542,110	5,551,750
Estonia	369,810	649,970	503,320	484,270	570,640
Finland	1,592,850	2,137,070	1,857,230	1,737,360	2,478,640
France	44,954,240	43,986,890	42,746,230	45,488,430	54,337,860
Germany	22,794,050	27,518,330	28,007,640	29,970,780	36,278,620
Greece	7,852,450	8,146,160	8,206,580	8,543,680	10,625,050
Ireland	2,656,000	2,150,890	1,957,370	1,885,000	2,125,240
Italy	32,464,720	31,712,300	32,824,790	34,999,240	40,994,940
Latvia	1,372,360	1,033,640	1,029,040	924,740	667,890
Lithuania	1,593,720	1,872,500	2,167,280	2,287,910	3,289,710
Luxembourg	166,110	157,990	152,740	207,150	219,030
Malta	45,440	49,050	43,550	44,350	49,290
Netherlands	16,510,120	17,199,660	16,580,500	18,627,560	19,262,600
Poland	10,884,080	11,798,490	12,925,060	13,620,870	19,754,080
Portugal	4,374,750	4,658,120	4,752,720	5,941,800	6,264,630
Czech Republic	2,964,330	3,112,670	3,302,550	4,044,020	4,644,980
Romania	13,153,460	13,269,410	10,914,360	15,028,320	14,583,450
Slovakia	1,236,370	1,211,620	1,288,880	1,485,070	1,776,230
Slovenia	797,890	734,800	786,150	724,270	832,690
Spain	31,405,760	30,108,330	30,484,600	35,229,220	37,203,110
Sweden	2,602,710	2,829,130	2,887,280	3,434,500	3,986,400
Hungary	4,873,020	4,868,080	4,939,010	5,821,490	5,916,780
Total	218,346,750	224,279,400	224,134,170	250,615,800	290,200,300

Source: processed based on the data from Eurostat [5].

The average production per hectare reflects the yield of the wheat harvest expressed in kg/hectares. In the analysed period, the average production of wheat in Romania was:

4,793kg/ha in 2018, 4,749 kg/ha in 2019, 2,966 kg/ha in 2020, 4,797 kg/ha in 2021 and 4,004 kg/ha in 2022 (Table 6). This variation is caused by climate conditions, technologies used and soil structure.

The decrease in 2020 and the return of production in 2021 highlight the dependence of agriculture on climatic conditions. In the dry years (2020), production losses are 37%. The year 2022 shows that although the drought affected the harvest, the decline was not as great as in 2020 due to technological improvements.

The average production of maize per hectare in Romania in the period 2018-2022 (Table 7), in evolution, decreased. In 2018 the average production was 7,644 kilograms per hectare. In 2022, the average production was 3,298 kilograms per hectare. The evolution shows a general decline in maize yield in the years 2020 and 2022.

Table 6. Wheat yield in Romania (kg/ha)

2018	4,793
2019	4,749
2020	2,966
2021	4,797
2022	4,004

Source: processed based on the data from the Ministry of Agriculture and Rural Development [8].

Table 7. Corn yield in Romania (kg/ha)

2018	7,644
2019	6,502
2020	3,977
2021	5,802
2022	3,298

Source: processed based on the data from the National Institute of Statistics [9].

Table 8. Sunflower yield in Romania (kg/ha)

2018	3,041
2019	2,783
2020	1,858
2021	2,530
2022	1,927

Source: processed based on the data from the Ministry of Agriculture and Rural Development[8].

The average production of sunflower per hectare in the analyzed period is decreasing. In

2018, the average production was 3,041 kg/hectare. In 2022, the average production of sunflower per hectare was 1,927 kg (Table 8). Analysis of the three crops shows that wheat is the most stable crop, corn the most vulnerable, and sunflower has an intermediate behaviour. Drought is the main factor affecting productivity, and the long-term solution is the development of irrigation and the use of modern technologies.

CONCLUSIONS

Romania's agricultural production during the 2018-2022 period recorded decreases in the main crops analysed. Even if Romania has an extensive arable agricultural area, the production per hectare is lower compared to the production per hectare of the Member States of the European Union. Among the proposed solutions to increase productivity are major investments in irrigation infrastructure together with large-scale adaptation of modern technologies. The aim of these measures is to sustain long-term performance and reduce vulnerability to climate change. Romanian agriculture is facing problems. The biggest problem is the high degree of land fragmentation, for which Romania is at the bottom of the European rankings. Romania has very many farms, most of which are subsistence farms

The average size of a farm in 2020 in Romania was 2.94 hectares, positioning Romania at the bottom of the European ranking. Land fragmentation and the predominance of small farms are associated with low performance and low competitiveness in the agricultural sector. This difference highlights the need for farmers' association and land consolidation policies.

Romania occupies an important position in the European Union in terms of the total volume of agricultural production, consistently ranking in the top seven in this criterion. This encouraging result is largely due to the significant arable agricultural area, with our country ranking six on this indicator. In spite of the good ranking on these indicators, the efficiency of the crop farming sector in terms of average productivity remains at the EU

average. The lower productivity yields highlight a few limitations.

Performance increases through farm modernization and higher labour productivity. Romania can better exploit its advantage of large agricultural area. The development of irrigation systems is the solution for Romania to increase its agricultural production.

Romania is among the EU Member States with the highest production volume. However, in terms of the performance of crop agricultural sector, Romania's position is close to the European average. This discrepancy shows the significant agricultural potential which is not being fully exploited highlighting the need for measures to modernize and increase productivity.

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