



Insights on Cereals Sector in Romania's 8 Development Regions

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ARTICLE INFO

Article history:
Accepted December 2024
Available online March 2025

JEL Classification
Q10, R14

Keywords:
cereals, cultivated area, production,
Romania's 8 Development Regions

ABSTRACT

Cereals represent a very important sector in Romania taking into account that in 2023 the total area cultivated with cereals was 5,168,467 hectares and the total production of cereals was 20,784,656 tons. This paper aims to present the branch of cereal sector from the Romania's 8 Development Regions, analyzing the following indicators: area cultivated, production and the average production per hectare for the following crops: cereals for grains, wheat, maize and barley. The present paper gives a special attention to the analyze of all of the indicators at the 8 Development Regions level from Romania. We used data for the period 2014-2023, provided by the National Institute of Statistics. Through the most cultivated cereals in Romania, in 2023, are cereals for grains (5.168.467 hectares) and wheat (2.317.692 hectares), while the highest production, in 2023, is in case of cereals for grains (2.0784.656 tons) and wheat (9.624.074 tons). The results of the present paper reveal which are the Development Region with the highest surface cultivated with each crop and also the Development Region with the highest production of the four crops analyzed. South-Muntenia Development Region is the most important regarding the area cultivated and also regarding the production of cereals in general and also for wheat, maize and barley.

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1. Introduction

Romania stands out as one of the European countries with the most favourable pedo-climatic conditions for agriculture. Its natural environment allows more than 40% of the country's total land area to be used for agricultural purposes (Radu, 2018). Cereals are important products for our daily diet, having a very important number of nutrients provided. (Belitz et al., 2009; Verma et al., 2023, Chaudhary et al., 2023, Awika, 2011). More than that, the cereals represent an important sector for the economy (Grigoras, 2016) and for ensuring food security, high life quality and living standard (Łaba et al., 2022), being products that cannot be consumed in raw, being necessary to cook them. (Kruzslিকা, 2018: Chiurciu et al., 2020)

Through the category cereals for grains take part: wheat, barley, maize, rye; wheat and maize being through the most important cereals in the world (Awika, 2011). Maize is the most produced cereal in the World. (Fischer et al., 2014)

In Romania, the most cultivated cereals in 2023 were cereals for grains, wheat, maize and barley. (National Institute of Statistics). Being a very important sector, it is important to know the production capacity and the competitiveness between each Development Regions from Romania

2. Research methodology

This research is based on data available at the National Institute of Statistics, for the main indicators characterizing the cereal sector for the last decade, most exactly for the period 2014-2023. For the analyse, we took into consideration the following key indicators: the total area cultivated with cereals for grains, wheat, maize and barley, considering their important area cultivated with them, respective 5,168,467 hectares with cereals for grains, 2,317,692 hectares with total wheat, 2,195,344 with maize and 393,767 hectares for barley, in 2023; the production and the average production per hectare.

In this paper the 8th Romania's economic Regions (NUTS2) were taking into consideration, as follow: North-East Development Region (Bacău, Botoșani, Iași, Neamț, Suceava, and Vaslui counties), South-East Development Region (Braila, Buzau, Constanta, Galati, Vrancea and Tulcea counties), South-Muntenia Development Region (Argeș, Călărași, Dâmbovița, Giurgiu, Ialomița, Prahova and Teleorman counties), South-

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West Oltenia Development Region (Dolj, Gorj, Mehedinți, Olt and Valcea counties), West Development Region (Arad, Caras Severin, Hunedoara and Timis counties), North-West Development Region (Bihor, Bistrita-Nasaud, Cluj, Sălaj, Satu Mare and Maramureș counties), Center Development Region (Alba, Brasov, Covasna, Harghita, Mures and Sibiu counties) and Bucharest-Ilfov Development Region (Bucharest municipality and Ilfov county). (Law 315/2004)

Graphs were constantly used in the study to highlight, as concisely as possible, the research results.

3. Results and discussions

This section is divided into 3 parts: area cultivated, production and the average production.

- **Area cultivated**

Cultivated area is among the factors that can influence positively the grain production (Pickson et al., 2020), together with the technology and infrastructure (Dragomir et al., 2023).

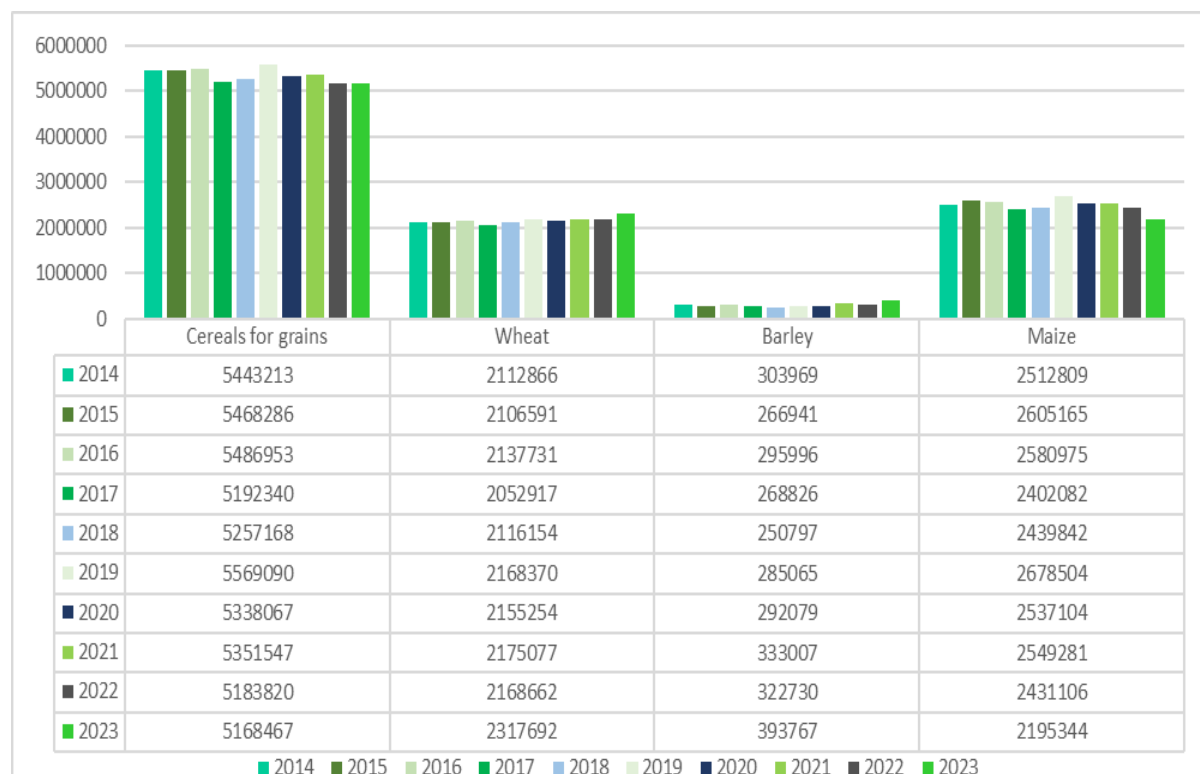


Figure 1. The total area cultivated with cereals for grains, wheat, maize and barley in the period 2014 -2023 (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

As it can be seen in Graphic 1, the total area cultivated with cereals for grains in Romania it was 5,443,213 hectares in 2014 and with 274,746 (5.05%) hectares less in 2023: 5,168,467 hectares. The largest area cultivated with cereals for grains, in the analyzed period, was 5,569,090 hectares, in 2019, and the smallest was in 2023, 5,168,467 hectares.

The total area cultivated with wheat in Romania it was 2,112,866 hectares in 2014 and with hectares 204,826 (9.7%) more in 2023: 2,317,692 hectares. The largest area cultivated with cereals for grains, in the analyzed period was 2,317,692 hectares in 2023, and the smallest was in 2017, 2,052,917 hectares.

The total area cultivated with maize in Romania it was 2,512,809 hectares in 2014 and with hectares 317,465 (12,6%) less in 2023: 2,195,344 hectares. The largest area cultivated with maize, in the analyzed period was 2,678,504 hectares in 2019, and the smallest was in 2023, 2,195,344 hectares.

The total area cultivated with barley in Romania it was 303,969 hectares in 2014 and with hectares 89,798 hectares (29.6%) more in 2023: 393,767 hectares. The largest area cultivated with barley, in the analyzed period was 393,767 hectares in 2023, and the smallest was in 2018, 250,797 hectares.

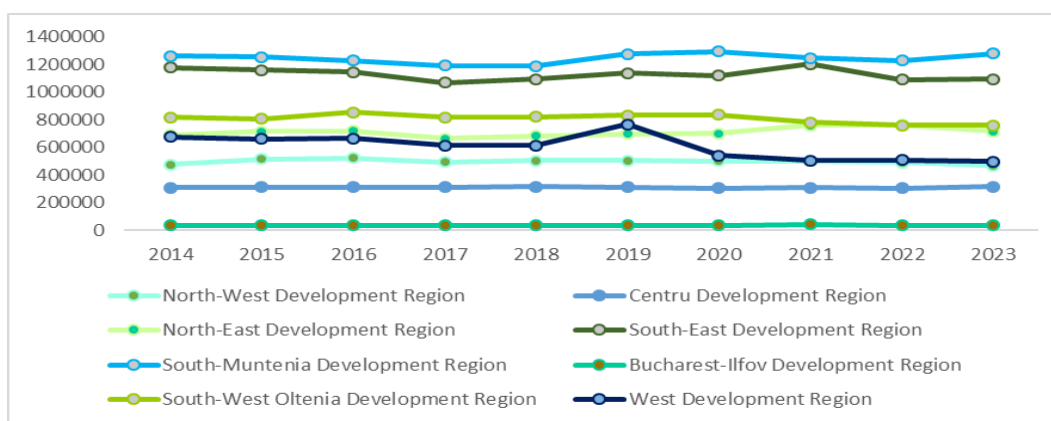


Figure 2. Area cultivated with cereals for grains in the period 2014 -2023 in the 8 Development Regions (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

The largest area cultivated with cereals for grains in 2023 was in South-Muntenia Development Region, 1,280,864 hectares, followed by South-East Development Region with 1,093,572 hectares and by South-West Oltenia Development Region with 759,953 hectares.

From 2014 to 2023, the dynamics of the area cultivated with cereals for grains in the 8 Development Region, presented in Graphic 2, looks like this:

- in North-West Development Region the area cultivated decreased with 8,820 hectares (1.8%), from 476,597 hectares in 2014 to 467,777 hectares in 2023;
- in Center Development Region the area cultivated increased with 9,444 hectares (3.1%), from 306,828 hectares in 2014 to 316,272 hectares in 2023;
- in North-East Development Region the area cultivated increased with 25,775 hectares (3.8%), from 689,035 hectares in 2014 to 714,810 hectares in 2023;
- in South-East Development Region the area cultivated decreased with 85,605 hectares (7.06%), from 1,179,177 hectares in 2014 to 1,093,572 hectares in 2023;
- in South-Muntenia Development Region the area cultivated increased with 17,864 hectares (1.41%), from 1,263,000 hectares in 2014 to 1,280,864 hectares in 2023;
- in Bucharest-Ilfov Development Region the area cultivated increased with 482 hectares (1.34%), from 35,978 hectares in 2014 to 36,460 hectares in 2023;
- in South-West Oltenia Development Region the area cultivated decreased with 57,121 hectares (6.09%), from 817,074 hectares in 2014 to 759,953 hectares in 2023;
- in West Development Region the area cultivated decreased with 176,765 hectares (27.07%), from 675,524 hectares in 2014 to 498,759 hectares in 2023.

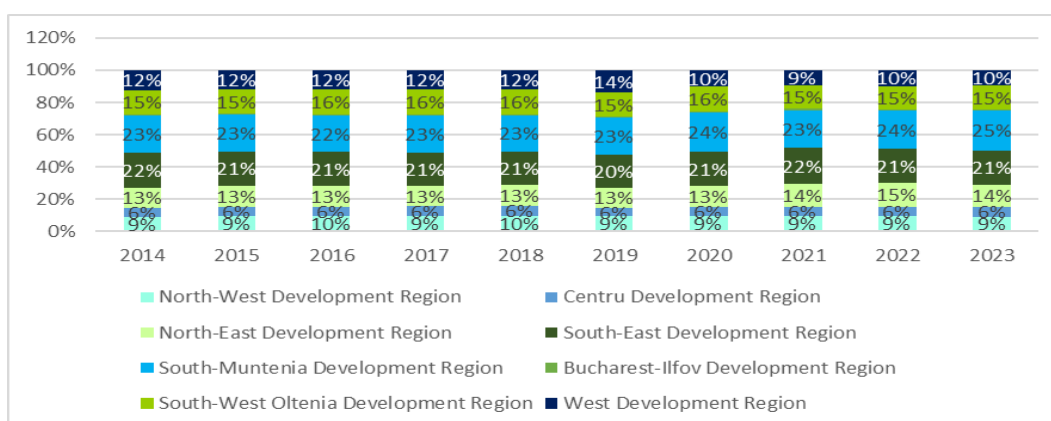


Figure 3. The share of the area cultivated with cereals for grains in the 8 Development Regions in the total area cultivated with cereals for grains in the period 2014-2023 (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total area cultivated with cereals for grains among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (23.3% of the total) followed by South-East Development Region (21.2%) and by South-West Oltenia Development Region (15.1%), as represented in Graphic 3.

The largest area cultivated with wheat in 2023 was in South-Muntenia Development Region, 624,696 hectares, followed by South-East Development Region with 511,464 hectares and by South-West Oltenia Development Region with 421,360 hectares.

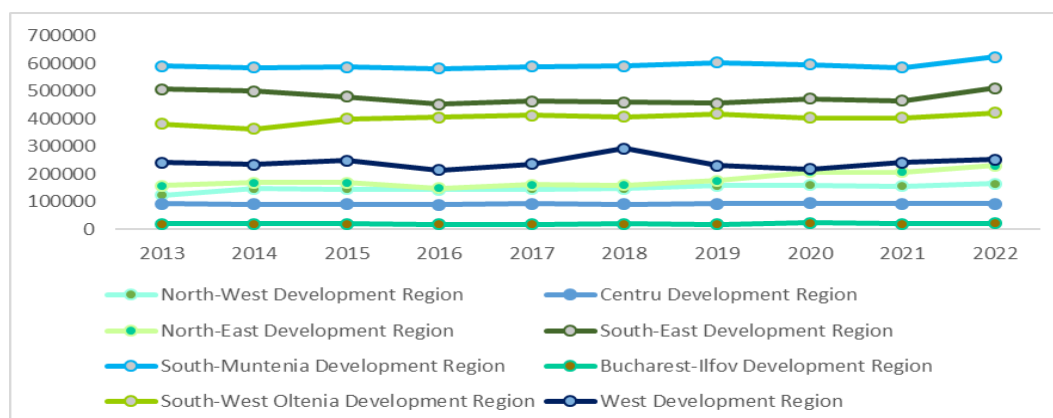


Figure 4. Area cultivated with wheat in the period 2014 -2023 in the 8 Development Regions (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the area cultivated with wheat in the 8 Development Regions, presented in Graphic 4, looks like this:

- in North-West Development Region the area cultivated increased with 42,138 hectares (34.28%), from 122,922 hectares in 2014 to 165,060 hectares in 2023;
- in Center Development Region the area cultivated increased with 512 hectares (0.56%), from 91,308 hectares in 2014 to 91,820 hectares in 2023;
- in North-East Development Region the area cultivated increased with 71,888 hectares (45.38%), from 158,401 hectares in 2014 to 230,289 hectares in 2023;
- in South-East Development Region the area cultivated increased with 4,451 hectares (0.88%), from 507,013 hectares in 2014 to 511,464 hectares in 2023;
- in South-Muntenia Development Region the area cultivated increased with 34,113 hectares (5.78%), from 590,583 hectares in 2014 to 624,696 hectares in 2023;
- in Bucharest-Ilfov Development Region the area cultivated increased with 1,876 hectares (10.22%), from 18,359 hectares in 2014 to 20,235 hectares in 2023;
- in South-West Oltenia Development Region the area cultivated increased with 39,324 hectares (10.29%), from 382,036 hectares in 2014 to 421,360 hectares in 2023;
- in West Development Region the area cultivated increased with 10,524 hectares (4.34%), from 242,244 hectares in 2014 to 252,768 hectares in 2023.

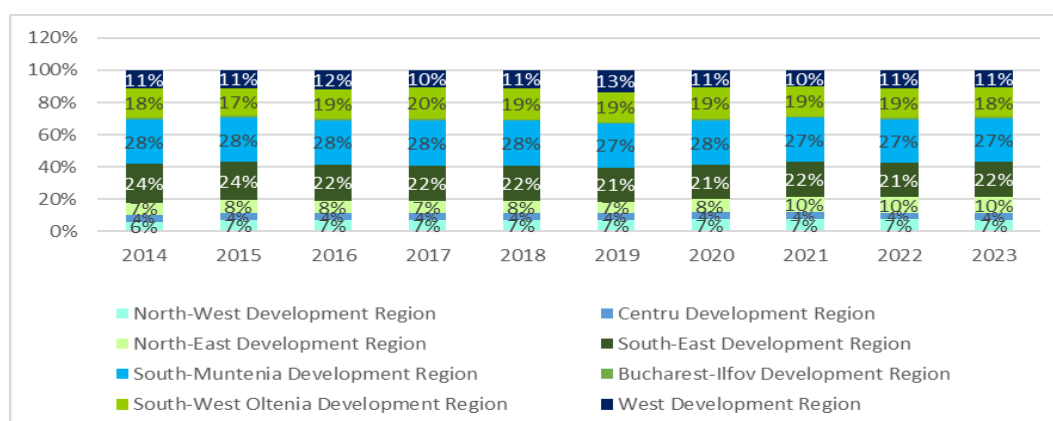


Figure 5. The share of the area cultivated with wheat in the 8 Development Regions in the total area cultivated with wheat in the period 2014-2023 (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total area cultivated with wheat among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (27.7% of the total), followed by South-East Development Region (22.4%) and by South-West Oltenia Development Region (18.7%), as represented in Graphic 5.

The largest area cultivated with maize in 2023 was in South-Muntenia Development Region, 486,997 hectares, followed by North-East Development Region with 430,586 hectares and by South-East Development Region with 399,620 hectares.

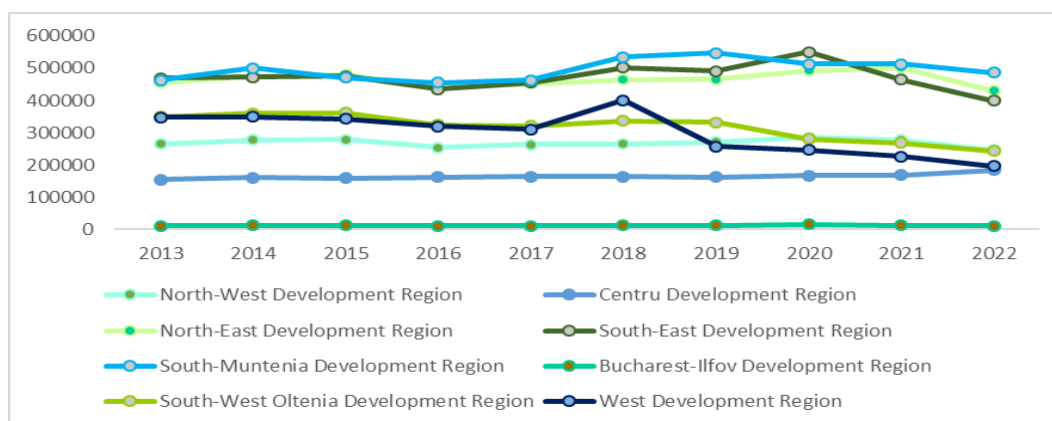


Figure 6. Area cultivated with maize in the period 2014 -2023 in the 8 Development Regions (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the area cultivated with maize in the 8 Development Regions, presented in Graphic 6, looks like this:

- in North-West Development Region the area cultivated decreased with 19,681 hectares (7.42%), from 265,360 hectares in 2014 to 245,679 hectares in 2023;
- in Center Development Region the area cultivated increased with 29,497 hectares (19.24%), from 153,338 hectares in 2014 to 182,835 hectares in 2023;
- in North-East Development Region the area cultivated decreased with 24,694 hectares (5.42%), from 455,280 hectares in 2014 to 430,586 hectares in 2023;
- in South-East Development Region the area cultivated decreased with 70,061 hectares (14.02%), from 469,681 hectares in 2014 to 399,620 hectares in 2023;
- in South-Muntenia Development Region the area cultivated increased with 24,456 hectares (5.29%), from 462,541 hectares in 2014 to 486,997 hectares in 2023;
- in Bucharest-Ilfov Development Region the area cultivated increased with 968 hectares (9.87%), from 9,804 hectares in 2014 to 10,772 hectares in 2023;
- in South-West Oltenia Development Region the area cultivated decreased with 106,952 hectares (30.62%), from 349,284 hectares in 2014 to 242,332 hectares in 2023;
- in West Development Region the area cultivated decreased with 150,998 hectares (43.45%), from 347,521 hectares in 2014 to 196,523 hectares in 2023.

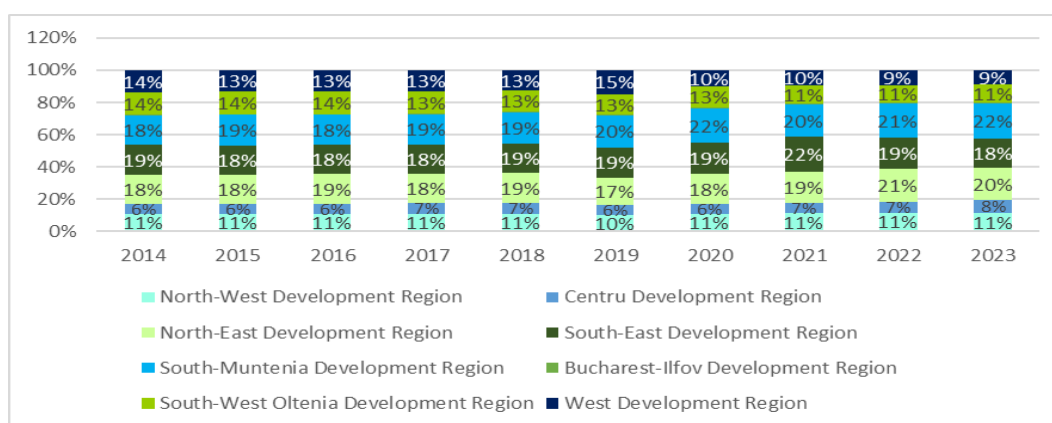


Figure 7. The share of the area cultivated with maize in the 8 Development Regions in the total area cultivated with maize in the period 2014-2023 (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total area cultivated with maize among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (19.8% of the total), followed by South-East Development Region (18.9%) and by North-East Development Region (18.7%), as represented in Graphic 7.

The largest area cultivated with barley in 2023 was in South-East Development Region, 139,693 hectares, followed by South-Muntenia Development Region with 130,249 hectares and by South-West Oltenia Development Region with 55,861 hectares.

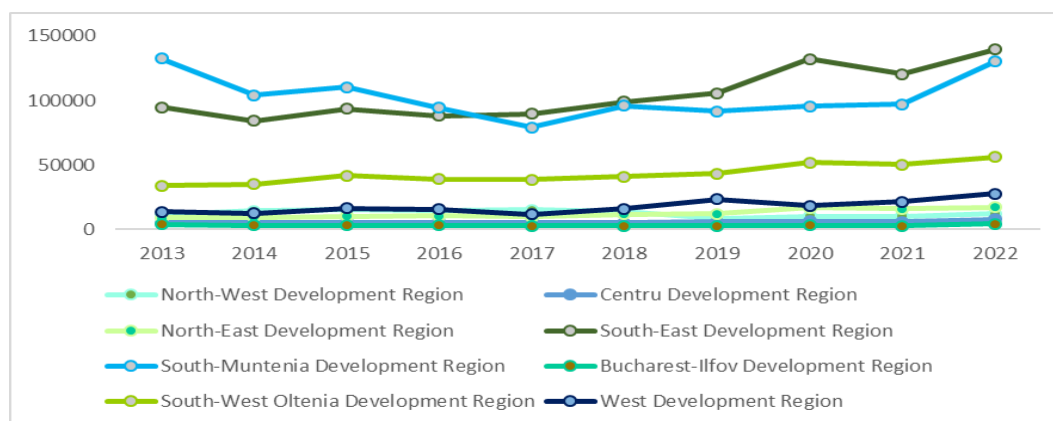


Figure 8. Area cultivated with barley in the period 2014 -2023 in the 8 Development Regions (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the area cultivated with barley in the 8 Development Regions, presented in Graphic 8, looks like this:

- in North-West Development Region the area cultivated increased with 142 hectares (1.22%), from 11,620 hectares in 2014 to 11,762 hectares in 2023;
- in Center Development Region the area cultivated increased with 2,716 hectares (55.43%), from 4,900 hectares in 2014 to 7,616 hectares in 2023;
- in North-East Development Region the area cultivated increased with 8,215 hectares (93.04%), from 8,830 hectares in 2014 to 17,045 hectares in 2023;
- in South-East Development Region the area cultivated increased with 45,113 hectares (47.70%), from 94,580 hectares in 2014 to 139,693 hectares in 2023;
- in South-Muntenia Development Region the area cultivated decreased with 2,382 hectares (1.8%), from 132,631 hectares in 2014 to 130,249 hectares in 2023;
- in Bucharest-Ilfov Development Region the area cultivated increased with 237 hectares (6.12%), from 3,873 hectares in 2014 to 4,110 hectares in 2023;
- in South-West Oltenia Development Region the area cultivated increased with 21,977 hectares (64.86%), from 33,884 hectares in 2014 to 55,861 hectares in 2023;
- in West Development Region the area cultivated increased with 13,781 hectares (100.95%), from 13,651 hectares in 2014 to 27,432 hectares in 2023.

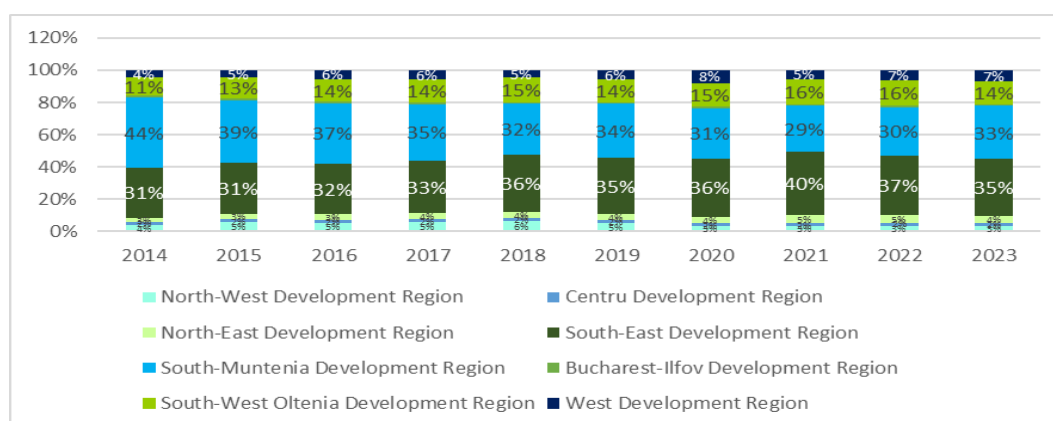


Figure 9. The share of the area cultivated with barley in the 8 Development Regions in the total area cultivated with barley in the period 2014-2023 (hectares)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total area cultivated with barley among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (34.9% of the total), followed by South-East Development Region (34.2%) and by South- West Oltenia Development Region (14.0%), as represented in Graphic 9.

As other authors (Voicilaş, 2014) presented in their paper referred to the period 1990-2012, is important to note that the South-Muntenia Development Region is the most important in terms of area cultivated with cereals.

- **Production**

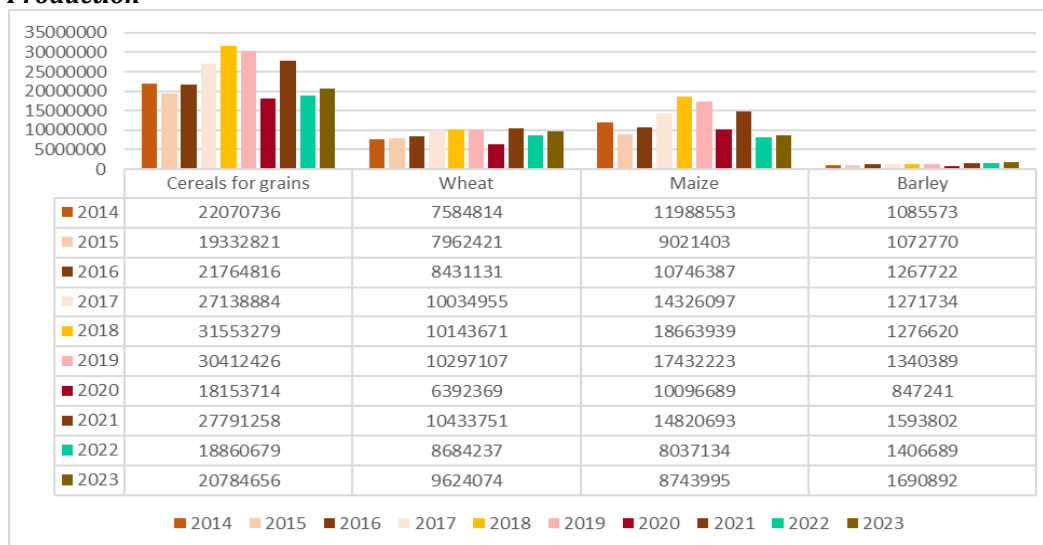


Figure 10. The total production of cereals for grains, wheat, maize and barley in the period 2014 - 2023 (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

The total production with cereals for grains in Romania (Graphic 10) it was 22,070,736 tons in 2014 and with 1,286,080 tons (6%) less in 2023: 20,784,656 tons. The largest production with cereals for grains, in the analyzed period, was 31,553,279 tons in 2018, and the smallest was in 2020: 18,153,714 tons.

The total production with wheat in Romania it was 7,584,814 tons in 2014 and with 2,039,260 (27%) tons more in 2023: 9,624,074 tons. The largest production with cereals for grains, in the analyzed period was 10,433,751 tons in 2021, and the smallest was in 2020, 6,392,369 tons.

The total production with maize in Romania it was 11,988,553 tons in 2014 and with 3,244,558 (27%) tons less in 2023: 8,743,995 tons. The largest production with maize, in the analyzed period was 18,663,939 tons in 2018, and the smallest was in 2020: 8,037,134 tons.

The total production with barley in Romania it was 1,085,573 tons in 2014 and with 605,319 tons (56%) more in 2023: 1,690,892 tons. The largest production with barley, in the analyzed period was 1,690,892 tons in 2023, and the smallest was in 2020, 847,241 tons.

In 2020, the production it was visible affected for all of the analyzed crops due to an extreme drought. (Agerpres, 2020)

The highest production of cereals for grains in 2023 was in South-Muntenia Development Region, 5,179,264 tons, followed by South-East Development Region with 3,795,668 tons and by South-West Oltenia Development Region with 3,076,028 tons.

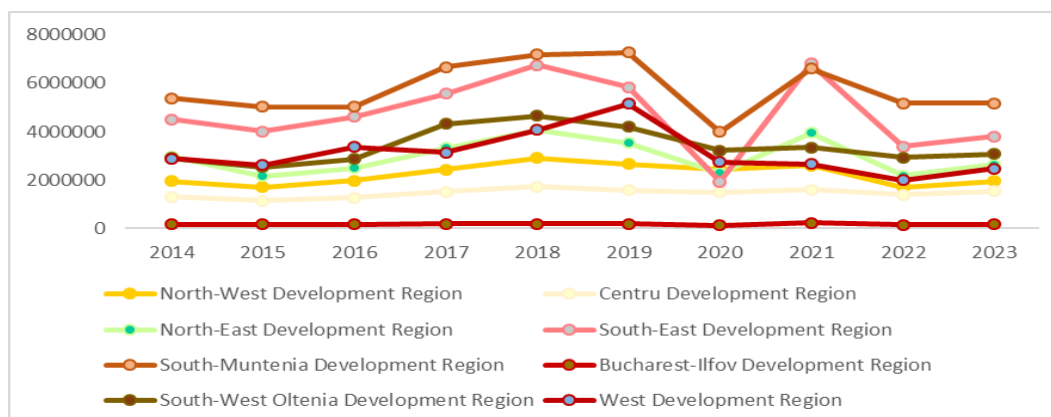


Figure 11. The production of cereals for grains in the period 2014 -2023 in the 8 Development Regions (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the cereals for grains production in the 8 Development Regions, presented in Graphic 11, looks like this:

- in North-West Development Region the production increased with 1,464 hectares (0.1%), from 1,955,323 hectares in 2014 to 1,956,787 hectares in 2023;
- in Center Development Region the production increased with 241,065 hectares (18.6%), from 1,293,341 hectares in 2014 to 1,534,406 hectares in 2023;
- in North-East Development Region the production decreased with 344,005 hectares (11.6%), from 2,973,767 hectares in 2014 to 2,629,762 hectares in 2023;
- in South-East Development Region the production decreased with 714,390 hectares (15.8%), from 4,510,058 hectares in 2014 to 3,795,668 hectares in 2023;
- in South-Muntenia Development Region the production decreased with 207,004 hectares (3.8%), from 5,386,268 hectares in 2014 to 5,179,264 hectares in 2023;
- in Bucharest-Ilfov Development Region the production decreased with 6,627 hectares (4.3%), from 153,089 hectares in 2014 to 146,462 hectares in 2023;
- in South-West Oltenia Development Region the production increased with 168,235 hectares (5.8%), from 2,907,793 hectares in 2014 to 3,076,028 hectares in 2023;
- in West Development Region the production decreased with 424,818 hectares (14.7%), from 2,891,097 hectares in 2014 to 2,466,279 hectares in 2023.

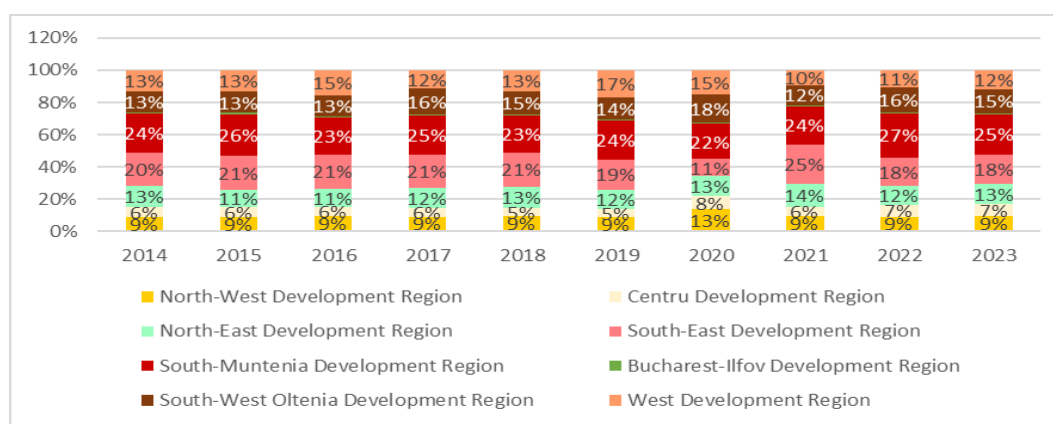


Figure 12. The share of the production of cereals for grains from 8 Development Regions in the total production of cereals for grains in the period 2014-2023 (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total production of cereals for grains among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (24.3% of the total, on average), followed by South-East Development Region (19.5% on average) and by South- West Oltenia Development Region (14.4% on average), as represented in Graphic 12.

The highest production of wheat in 2023 was in South-Muntenia Development Region, 2,743,952 tons, followed by South-East Development Region with 1,869,580 tons and by South-West Oltenia Development Region with 1,712,787 tons.

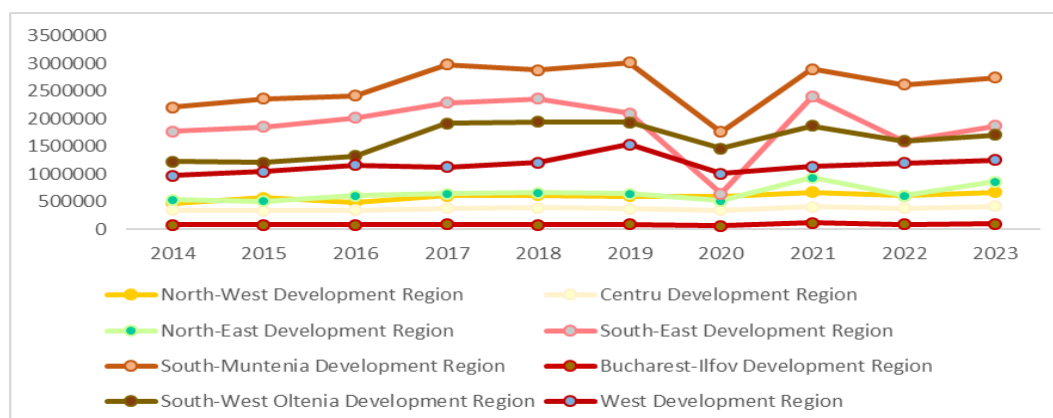


Figure 13. The production of wheat in the period 2014 -2023 in the 8 Development Regions (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the wheat production in the 8 Development Regions, presented in Graphic 13, looks like this:

- in North-West Development Region the production increased with 199,369 hectares (42.2%), from 472,422 hectares in 2014 to 671,791 hectares in 2023;
- in Center Development Region the production increased with 78,686 hectares (23.3%), from 337,776 hectares in 2014 to 416,462 hectares in 2023;
- in North-East Development Region the production increased with 334,513 hectares (63.2%), from 529,045 hectares in 2014 to 863,558 hectares in 2023;
- in South-East Development Region the production increased with 102,062 hectares (5.8%), from 1,767,518 hectares in 2014 to 1,869,580 hectares in 2023;
- in South-Muntenia Development Region the production increased with 531,562 hectares (24.0%), from 2,212,388 hectares in 2014 to 2,743,952 hectares in 2023;
- in Bucharest-Ilfov Development Region the production increased with 17,589 hectares (23.7%), from 74,085 hectares in 2014 to 91,674 hectares in 2023;
- in South-West Oltenia Development Region the production increased with 491,280 hectares (40.2%), from 1,221,507 hectares in 2014 to 1,712,787 hectares in 2023;
- in West Development Region the production increased with 284,197 hectares (29.3%), from 970,073 hectares in 2014 to 1,254,270 hectares in 2023.

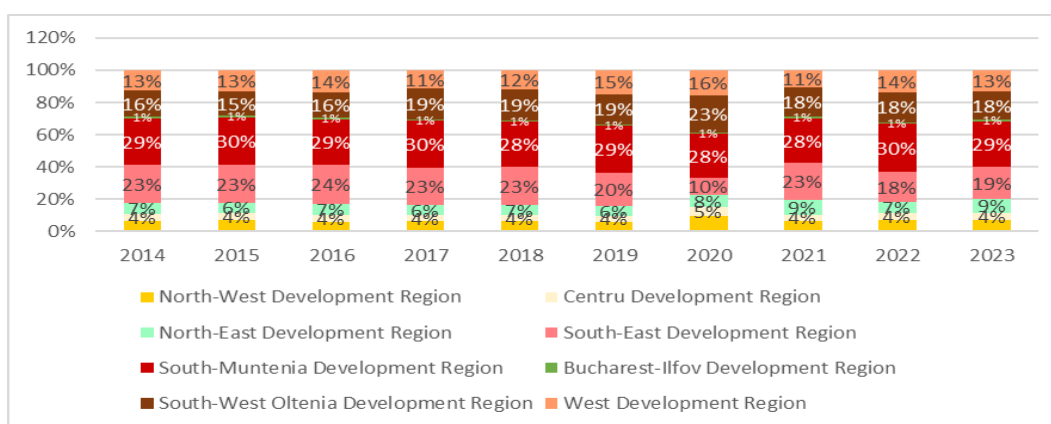


Figure 14. The share of the production of wheat from 8 Development Regions in the total production of wheat in the period 2014-2023 (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total production of wheat among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (28.9% of the total, on average), followed by South-East Development Region (20.8%, on average) and by South- West Oltenia Development Region (18.1%, on average), as represented in Graphic 14.

The highest production of maize in 2023 was in South-Muntenia Development Region, 1,725,152 tons, followed by North-East Development Region with 1,605,293 tons and by South-East Development Region with 1,235,471 tons.

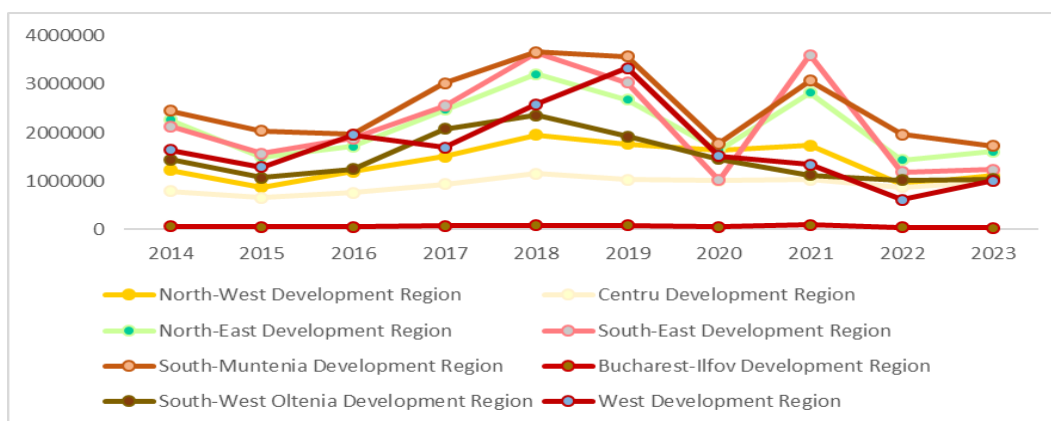


Figure 15. The production of maize in the period 2014 -2023 in the 8 Development Regions (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the maize production in the 8 Development Regions, presented in Graphic 15, looks like this:

- in North-West Development Region the production decreased with 112,463 hectares (9.2%), from 1,226,272 hectares in 2014 to 1,113,809 hectares in 2023;
- in Center Development Region the production increased with 201,065 hectares (25.5%), from 789,254 hectares in 2014 to 990,319 hectares in 2023;
- in North-East Development Region the production decreased with 656,016 hectares (29%), from 2,261,309 hectares in 2014 to 1,605,293 hectares in 2023;
- in South-East Development Region the production decreased with 892,287 hectares (41.9%), from 2,127,758 hectares in 2014 to 1,235,471 hectares in 2023;
- in South-Muntenia Development Region the production decreased with 724,098 hectares (29.6%), from 2,449,250 hectares in 2014 to 1,725,152 hectares in 2023;
- in Bucharest-Ilfov Development Region the production decreased with 23,374 hectares (45.5%), from 52,475 hectares in 2014 to 29,101 hectares in 2023;
- in South-West Oltenia Development Region the production decreased with 409,157 hectares (28.3%), from 1,444,982 hectares in 2014 to 1,035,825 hectares in 2023;
- in West Development Region the production decreased with 628,228 hectares (38.4%), from 1,637,253 hectares in 2014 to 1,009,025 hectares in 2023.

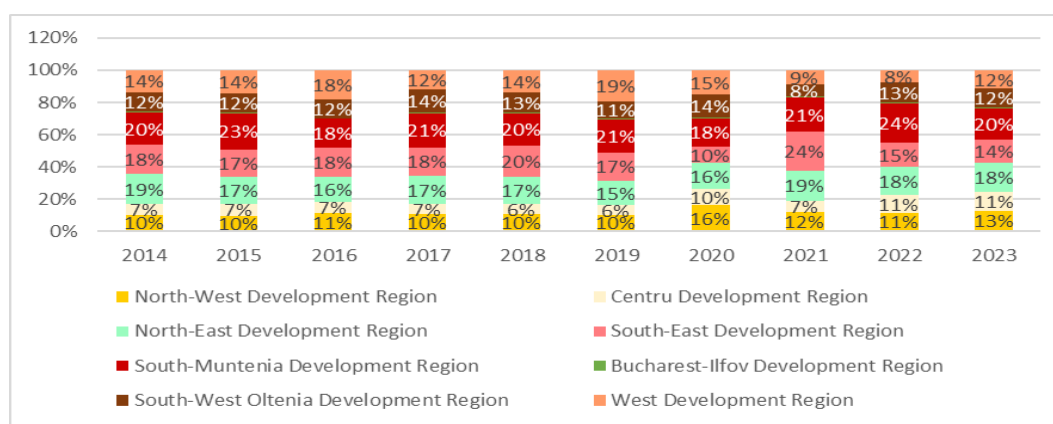


Figure 16. The share of the production of maize from 8 Development Regions in the total production of maize in the period 2014-2023 (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total production of maize among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (20.5% of the total, on average), followed by South-East Development Region (17.3%, on average) and by South-East Development Region (17.1%, on average), as represented in Graphic 16.

The highest production of barley in 2023 was in South-East Development Region, 586,929 tons, followed by South-Muntenia Development Region with 580,072 tons and by South-West Oltenia Development Region with 226,547 tons.

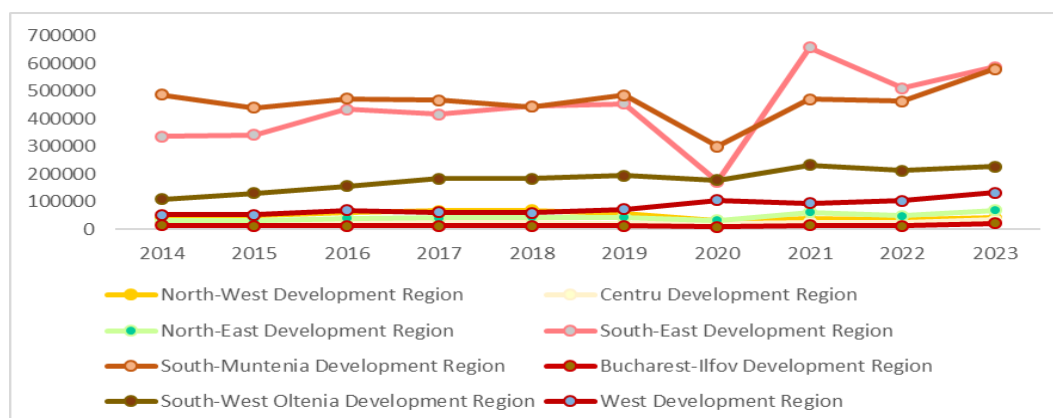


Figure 17. The production of barley in the period 2014 -2023 in the 8 Development Regions (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From 2014 to 2023, the dynamics of the barley production in the 8 Development Regions, presented in Graphic 17, looks like this:

- in North-West Development Region the production increased with 129 hectares (0.3%), from 41,665 hectares in 2014 to 41,794 hectares in 2023;
- in Center Development Region the production increased with 16,238 hectares (95.9%), from 16,941 hectares in 2014 to 33,179 hectares in 2023;
- in North-East Development Region the production increased with 39,734 hectares (134.7%), from 29,505 hectares in 2014 to 69,239 hectares in 2023;
- in South-East Development Region the production increased with 251,053 hectares (74.7%), from 335,876 hectares in 2014 to 586,929 hectares in 2023;
- in South-Muntenia Development Region the production increased with 93,446 hectares (19.2%), from 486,626 hectares in 2014 to 580,072 hectares in 2023;
- in Bucharest-Ilfov Development Region the production increased with 6,161 hectares (43.4%), from 14,212 hectares in 2014 to 20,373 hectares in 2023;
- in South-West Oltenia Development Region the production increased with 117,582 hectares (107.9%), from 108,965 hectares in 2014 to 226,547 hectares in 2023;
- in West Development Region the production increased with 80,978 hectares (156.4%), from 51,783 hectares in 2014 to 132,759 hectares in 2023.

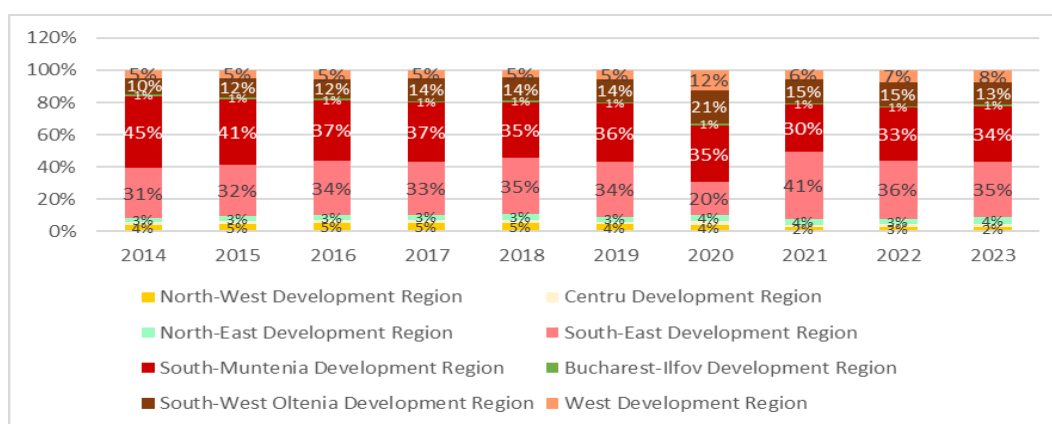


Figure 18. The share of the production of barley from 8 Development Regions in the total production of barley in the period 2014-2023 (tons)

Source: www.inss.ro (Accessed on 26.08.2024)

From the total production of barley among all of the analyzed period, 2014-2023, the largest percentage was owned by the region South-Muntenia Development Region (36.3% of the total, on average), followed by South-East Development Region (33.1%, on average) and by South-West Oltenia Development Region (14.2%, on average), as represented in Graphic 18.

- **The average production per hectare**

The production of cereals can be negatively influenced by numerous factors among which CO2 emission and temperature (Pickson et al., 2020).

The average production was calculated by dividing the total production per year by the total area cultivated with cereals for grains, wheat, maize and barley per year.

The average production of cereals for grains in Romania and in the 8 Development Regions presents a oscillate trend in the analyzed period; in 2014 the average production per hectare it was 4.05 tons/hectare and in 2023 it was 4.02 tons/hectare. The highest average production of cereals for grains in North-West Development Region (6 tons/hectare), in Center Development Region (5.74 tons/hectare), North-East Development Region (5.48 tons/hectare), South-East Development Region (6.17 tons/hectare), South-Muntenia Development Region (6.05 tons/hectare), Bucharest-Ilfov Development Region (5.29 tons/hectare), South-West Oltenia Development Region (5.66 tons/hectare) was in 2018 while in West Development Region (6.71 tons/hectare) it was in 2019. The lowest average production with cereals for grains in North-West Development Region (3.40 tons/hectare), in Center Development Region (3.30 tons/hectare) and in South-West Oltenia Development Region (3.93 tons/hectare) was in 2015, while in North-East Development Region (2.85 tons/hectare) and in West Development Region (2.85 tons/hectare) it was in 2022, while in South-East Development Region (1.71 tons/hectare), South-Muntenia Development Region (3.07 tons/hectare), Bucharest-Ilfov Development Region (3.36 tons/hectare) it was in 2020.

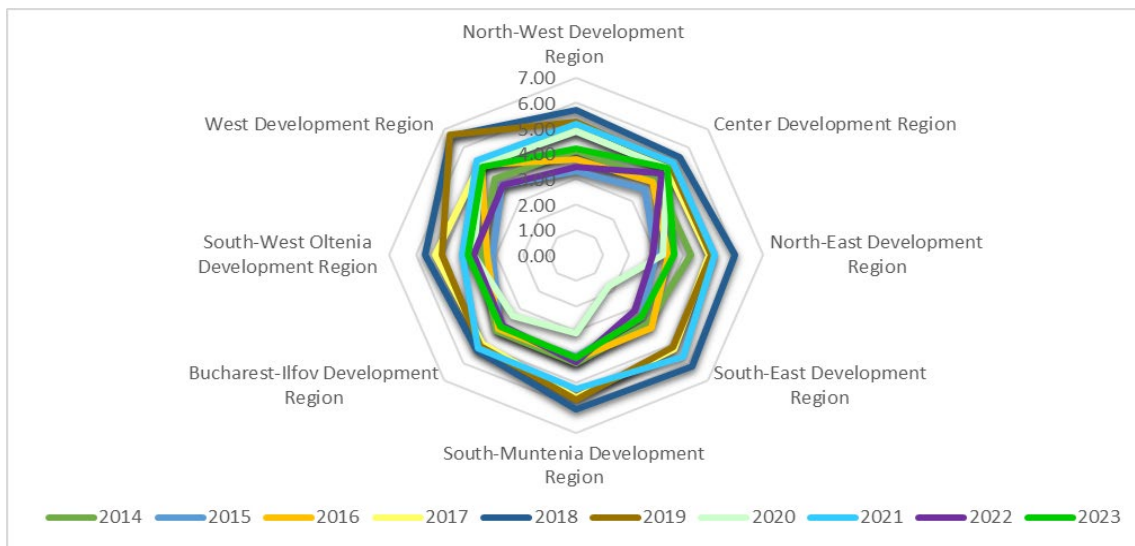


Figure 19. The average production of cereals for grains per (tons/hectares)

Source: own processing based on data available at www.inss.ro (Accessed on 26.08.2024)

In the analyzed period, 2014-2023, the average production of cereals for grains was 5,09 tons/hectare in West Development Region, 4,67 tons/hectare in Center Development Region, 4,63 tons/hectare in South-Muntenia Development Region, 4,48 tons/hectare in North-West Development Region, 4,43 tons/hectare Bucharest-Ilfov Development Region, 4,20 tons/hectare in South-West Oltenia Development Region and 4,18 tons/hectare in North-East Development Region and South-East Development Region, as can be observed in Graphic 19.

The average production of wheat in Romania and in the 8 Development Regions presents a oscillate trend in the analyzed period; in 2014 the average production per hectare was 3.59 tons/hectare and in 2023 it was 4.15 tons/hectare. The highest average production of wheat in North-West Development Region (4.28 tons/hectare) and in South-East Development Region (5.09 tons/hectare) was in 2018, in Center Development Region (4.54 tons/hectare) it was in 2023, in North-East Development Region (4.51 tons/hectare) it was in 2021, in South-Muntenia Development Region (5.13 tons/hectare) and in West Development Region (5.27 tons/hectare) it was in 2017, in Bucharest-Ilfov Development Region (5.04 tons/hectare) it was in 2021, while in South-West Oltenia Development Region (4.75 tons/hectare) it was in 2019. The lowest average production with wheat in North-West Development Region (3.38 tons/hectare) it was in 2016, in North-East Development Region (2.92 tons/hectare), in South-East Development Region (1.41 tons/hectare), in South-Muntenia Development Region (2.91 tons/hectare), in Bucharest-Ilfov Development Region (3.35 tons/hectare) it was in 2020, in West Development Region (4.0 tons/hectare), in South-West Oltenia Development Region (3.20 tons/hectare) and in Center Development Region (3.70 tons/hectare) it was in 2014.

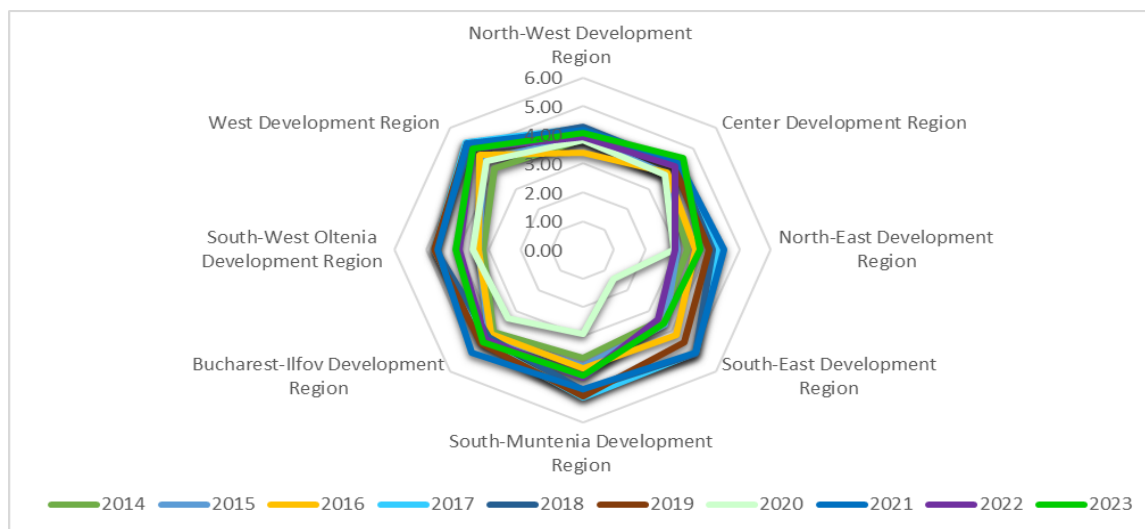


Figure 20. The average production of wheat per (tons/hectares)

Source: own processing based on data available at www.inss.ro (Accessed on 26.08.2024)

In the analyzed period, 2014-2023, the average production of wheat was 4,83 tons/hectare in West Development Region, 4,37 tons/hectare in South-Muntenia Development Region, 4,17 tons/hectare in North-West Development Region, 4,02 tons/hectare in South-West Oltenia Development Region, 4,05 tons/hectare Center Development Region, 3,97 tons/hectare in South-East Development Region and North-West Development Region, 3,97 tons/hectare in Center Development Region and 3,66 in North-East Development Region, as can be observed in Graphic 20.

The average production of maize in Romania and in the 8 Development Regions presents a oscillate trend in the analyzed period; in 2014 the average production per hectare was 4.77 tons/hectare and in 2023 it was 3.98 tons/hectare. The highest average production of maize in North-West Development Region (7.40 tons/hectare), in Center Development Region (7.05 tons/hectare), in North-East Development Region (7.10 tons/hectare), in South-East Development Region (8.02 tons/hectare), in South-Muntenia Development Region (87.92 tons/hectare), in Bucharest-Ilfov Development Region (7.62 tons/hectare), in South-West Oltenia Development Region (7.35 tons/hectare), in West Development Region (8.34 tons/hectare) was in 2018. The lowest average production of maize in North-West Development Region (3.16 tons/hectare) and in Center Development Region (4.03 tons/hectare) it was in 2015, in North-East Development Region (2.86 tons/hectare) and in West Development Region (2.71 tons/hectare) it was in 2022, in South-East Development Region (2.07 tons/hectare) and in South-Muntenia Development Region (3.24 tons/hectare) it was in 2020, in Bucharest-Ilfov Development Region (2.70 tons/hectare) it was in 2023, in South-West Oltenia Development Region (2.96 tons/hectare) it was in 2015.

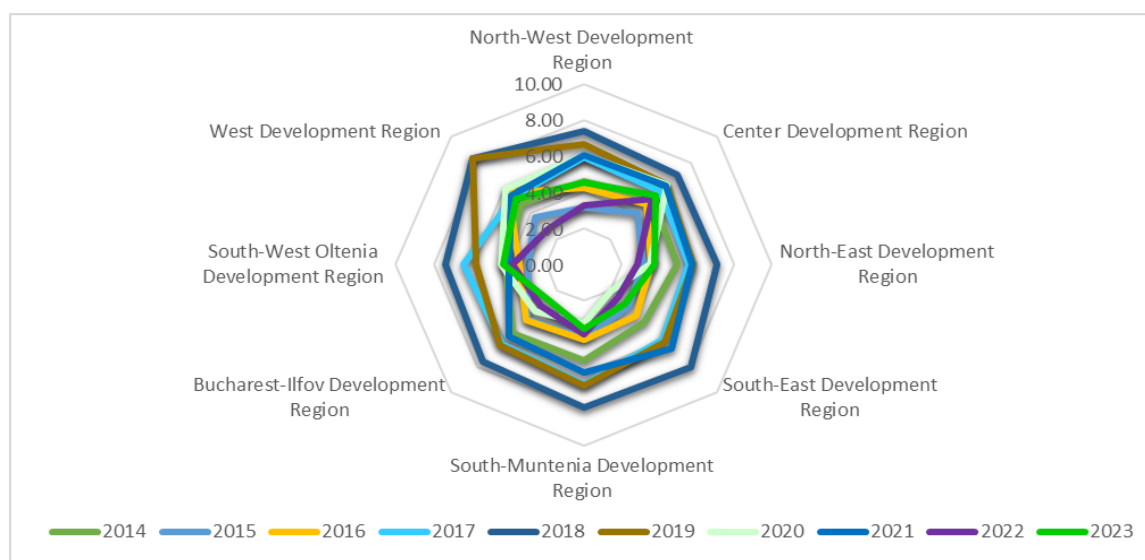


Figure 21. The average production of maize (tons/hectares)

Source: own processing based on data available at www.inss.ro (Accessed on 26.08.2024)

In the analyzed period, 2014-2023, the average production of maize was 5,6 tons/hectare in Center Development Region, 5,53 tons/hectare in West Development Region, 5,20 tons/hectare in North-West Development Region, 5,14 tons/hectare in South-Muntenia Development Region, 4,93 tons/hectare Bucharest-Ilfov Development Region, 4,64 tons/hectare in South-West Oltenia Development Region, and 4,60 tons/hectare in North-East Development Region and South-East Development Region, as can be observed in Graphic 21.

The average production of barley in Romania and in the 8 Development Regions presents a oscillate trend in the analyzed period; in 2014 the average production per hectare it was 3.57 tons/hectare and in 2023 it was 4.29 tons/hectare. The highest average production of barley in North-West Development Region (4.58 tons/hectare) and in South-West Oltenia Development Region (4.75 tons/hectare) it was in 2017, in Center Development Region (4.51 tons/hectare), in North-East Development Region (4.52 tons/hectare), in South-Muntenia Development Region (5.62 tons/hectare), in West Development Region (5.27 tons/hectare) it was in 2018, in Bucharest-Ilfov Development Region (4.96 tons/hectare) it was in 2023, while in South-East Development Region (4.99 tons/hectare) it was in 2021. The lowest average production with barley in North-West Development Region (3.40 tons/hectare) it was in 2015, in North-East Development Region (2.77 tons/hectare), in South-East Development Region (1.64 tons/hectare), in South-Muntenia Development Region (3.27 tons/hectare), in Bucharest-Ilfov Development Region (2.92 tons/hectare) it was in 2020, in South-West Oltenia Development Region (3.22 tons/hectare), in West Development Region (3.79 tons/hectare) and in Center Development Region (3.46 tons/hectare) it was in 2014.

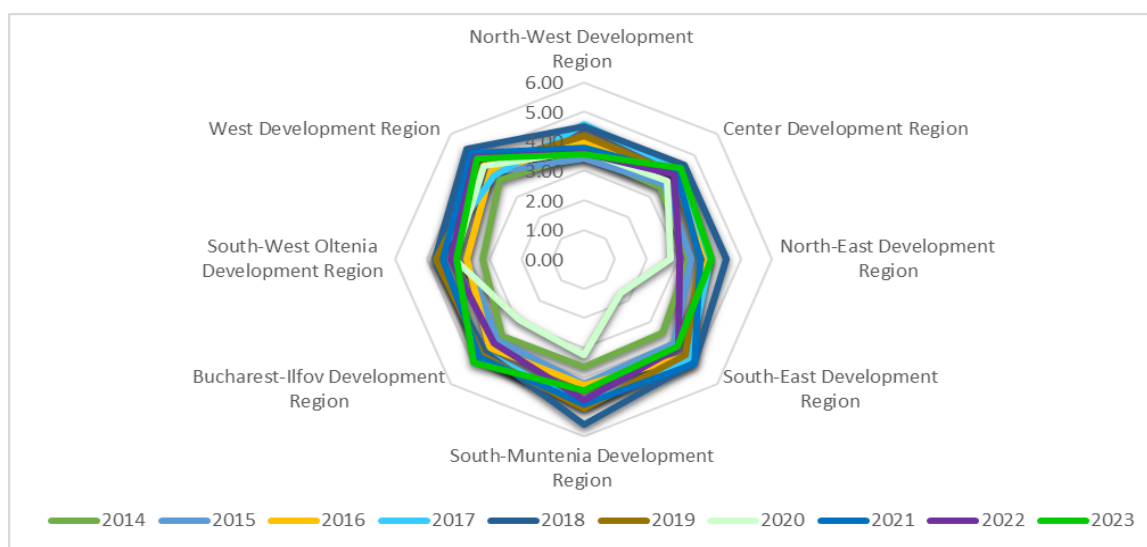


Figure 22. The average production of barley per (tons/hectares)

Source: own processing based on data available at www.inss.ro (Accessed on 26.08.2024)

In the analyzed period, 2014-2023, the average production of barley was 4,53 tons/hectare in West Development Region and South-Muntenia Development Region, 4,19 tons/hectare in Bucharest-Ilfov Development Region, 4,18 tons/hectare in South-West Oltenia Development Region, 4,16 tons/hectare in South-East Development Region, 4,05 tons/hectare Center Development Region, 3,88 tons/hectare in North-West Development Region, and 3,65 tons/hectare in North-East Development Region, as can be observed in Graphic 22.

5. Conclusions

Regarding the area cultivated, a very important indicator for the analyze of cereal sector, in this paper was presented that in the analyzed decade 2014-2023, the area cultivated with cereals for grains in Romania decreased by 5% (274.746 hectares) accounting 5.168.467 hectares in the year 2023, the area cultivated with wheat increased with 10% (204.826 hectares) accounting 2.317.692 hectares in 2023, area cultivated with maize decreased with 13% (317.465 hectares) and the area cultivated with barley increased with 30% (89.798 hectares).

Among all the analyzed crops, in 2014 the area cultivated with cereals for grains were most present in the South-Muntenia Development Region (1.263.000 hectares), the area cultivated with wheat was most present in the South-East Development Region (507.013 hectares), maize was most cultivated in the South-West Oltenia Development Region (349.284 hectares) and barley were most cultivated in the South-Muntenia Development Region (132.631 hectares). In 2023 the crops cereals for grains, wheat and maize were most cultivated in the South-Muntenia Development Region (1.280.864 hectares in case of cereals for grains category, 624.696 hectares in case of wheat and 486.997 hectares in case of maize), while the highest are cultivated with barley was registered in the South-East Development Region (139.693 hectares).

In the analyzed decade 2014-2023, cereals for grains production in Romania decreased by 6% (1.286.080 tons) accounting 20,784,656 tons in the year 2023, wheat production increased with 27% (2.039.260 tons) accounting 9.624.075 tons in 2023, maize production decreased with 27% (3.244.558 tons) and barley production increased with 56% (605.319 tons).

Among all the analyzed crops, in 2014 the production of cereals for grains were most present in the South-Muntenia Development Region (5.386.268 tons), wheat was most present in the South-Muntenia Development Region (2.212.388 tons), maize was most present also in the South-Muntenia Development Region (2.449.250) and barley were most present also in the South-Muntenia Development Region (486.626 tons). In 2023 the highest production with cereals for grains, wheat and maize were most present in the South-Muntenia Development Region (5.179.264 tons in case of cereals for grains category, 2.743.952 tons in case of wheat and 1.725.152 tons in case of barley), while the highest production of barley was registered in the South-East Development Region (586.929 tons).

In case of the average production per hectare of each crops can be observed that here exists a fluctuated trend in the majority of development regions due to different factors that can influence this indicator. Regarding the regional competitiveness, the South-Muntenia Development Region is the most important regarding the area cultivated and also regarding the production of cereals in general and also for wheat, maize and barley. In order to increase the competitiveness of cereal sector is important to turn more and more to modern and digitalized agriculture.

Acknowledgements

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

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