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THE PLACE AND ROLE OF THE SOUTH-WEST OLTENIA DEVELOPMENT REGION WITHIN THE NATIONAL CEREAL PRODUCTION (2017-2023)

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Abstract

The study focused on assessing the South-West Oltenia region's significance as a key cereal producer in Romania. Data on cultivated areas and cereal production, sourced from the National Institute of Statistics, were analyzed and interpreted for the period 2017-2023 using fixed-base and structural indices along with trend dynamics. The South-West Oltenia region encompasses a total area of 2,921,169 hectares (ranked 7th nationally, accounting for 12.25% of the total), with an agricultural area of 1,796,634 hectares (7th nationally, 12.28%) and an arable area of 1,251,902 hectares (4th nationally, 13.32%).The region has convenient agro-productive conditions for practicing cereal crops, given the climatic factors and some soils found in the region (sandy soils, from the Danube meadow and from the left bank of the Jiu River, for rye cultivation).The region cultivated cereal crops on 5,294,357 hectares (averaging 15.14% of the national total) and produced a total of 24,956,413.71 tons (14.74% of the national output). The average yield per hectare was 4,588 kg (97.33% of the national average). Thus, the South-West Oltenia Region is a significant player in the national cereal market, but there is a need to enhance current performance levels to fully capitalize on the region's potential.

Key words**:** *cereals, total production, cultivated surface, average production,*

INTRODUCTION

The South-West Oltenia Development Region is located, as its official name suggests, in the South-Western part of Romania, covering the entire territory of the historical region of Oltenia. The region is made up of five counties (Dolj, Gorj, Mehedinți, Olt and Vâlcea), which present a rather accentuated diversity of relief (meadow, plain, hill, plateau and mountain areas), somewhat variable climatic conditions (if we refer to the influence of altitude on climate), a differentiated socio-economic development degree (taking into account the existence of development poles around urban centres, such as Craiova, Râmnicu Vâlcea, Slatina, Târgu Jiu or DrobetaTurnu-Severin). The region stands out for a total area of 2,921,169 ha (7th place nationally – 12.25% of the total), an agricultural area of 1,796,634 ha (7th place nationally – 12.28%) and an arable area of 1,251,902 ha (4th place nationally – 13.32%). Taking into account the aforementioned aspects, as well as the agro-productive characteristics, it can be said that the region presents favourable conditions for the practice of cereal crops, even if the current climatic conditions can lead to the manifestation of drought that influences, in a negative sense, the productive potential of these species [1]. It is worth mentioning that some cereal species (in this case grain corn) have a marked ecological plasticity, and it can be successfully cultivated for the region in question [13]. The region is characterized by the existence of a wide range of soils, for which cereal species can be cultivated, as some authors specify [3], even if some of these species are somewhat sensitive to extreme meteorological phenomena [18].

In this context, it must be said that climate change is a threat to the level of agricultural crop production [2]. Climatic factors influence the level of cultivated areas of total production, as well as the economic results obtained by producers [9].

The regional analysis of cereal production within the national context is grounded in

Romania's status as a major cereal producer.[8, 15, 19], and as a result of this aspect, cereal production is preponderant within the vegetable sector and implicitly within agricultural production [5, 10, 11].
At the regional level, but more precisely at the level of Dolj County, the variation in total cereal production is related to the fluctuation of environmental factors [7], such as lack of water (drought) – to which sorghum is more resistant compared to other species, especially due to the particularities of its root system [17].
The importance of cereals is underlined by the versatility of their use at the socio-economic level [4]. For example, cereals play an essential role in human nutrition, but they can also have industrial, fodder, technological importance, etc. [6]. Also, in general, cereals are very much traded, but especially maize and wheat [14, 16].

MATERIALS AND METHODS

The conception and writing of the paper start from the defining aspects of cereal production (cultivated area - ha, total production - t, average production - kg/ha) that were extracted from the official national database [12]. The indicators refer to the overall level of the group and then to wheat, rye, barley and barley, oats, corn grains, sorghum, rice and "other cereals". The analysis presents the state of affairs specific to the period 2017-2023, at the level of each indicator presenting the situation by species for the average of the period.
To develop the paper, thorough documentation was conducted, along with data processing using methods such as percentage analysis and temporal comparison (highlighting indicator dynamics through specific indices) and spatial comparison (determining the region's position within the national context based on its share of area and total production, as well as comparing average yields to the national benchmark).

RESULTS AND DISCUSSIONS

Table 1 shows information on the cultivated area, for the whole group of crops.
The total national area ranged from 5,168,467 ha in 2023 to 5,569,090 ha in 2019. The indicator showed an increase from 2017 to 2021, with varying growth rates: +1.25% in 2018 (reaching 5,257,168 ha), +7.26% in 2019, +2.81% in 2020 (5,338,067 ha), and +3.07% in 2021 (5,351,547 ha), after which it decreases in the case of 2022 and 2023 (-0.16 and -0.46% effective levels of 5,183,820 and 5,168,467 ha respectively). This state of affairs, the uneven evolution, is also evidenced by the levels of the indices with a moving base, which were supra-unit for the years 2018, 2019 and 2021 (101.25, 105.93 and 100.25% respectively) and sub-unit for the other components of the dynamic series (95.85% in 2020, 96.87% for 2022 and 99.70% in the case of 2023).

Table 1. Cultivated area (ha)

Year	Romania			South-West Oltenia Region			
	Effective*	Dynamics **		Effective*	Dynamics **		Share at national level (%)**
		Ibf	Ibm		Ibf	Ibm	
2017	5,192,340	100	100	816,332	100	100	15.72
2018	5,257,168	101.25	101.25	822,223	100.72	100.72	15.64
2019	5,569,090	107.26	105.93	833,352	102.08	101.35	14.96
2020	5,338,067	102.81	95.85	837,868	102.64	100.54	15.70
2021	5,351,547	103.07	100.25	780,482	95.61	93.15	14.58
2022	5,183,820	99.84	96.87	761,261	93.25	97.54	14.69
2023	5,168,467	99.54	99.70	759,953	93.09	99.83	14.70

Source: National Institute of Statistics, online data base, *http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table,AGR108A – Cultivated Area for Major Crops, Classified by Ownership Type, Macro-Regions, Development Regions, and Counties, Accessed on 26.06.2024 [12]. **own calculation.

In the case of the South-West Oltenia Region, the area occupied with cereals was between 759,953 and 837,868 ha in the case of 2023 and 2020, respectively. We can talk about years in which the indicator did not reach the level of 800,000 ha (2023, 2022 – 761,261 ha and 2021

– 780,482 ha), as well as years exceeding this level (2017 – 816,332 ha, 2018 – 822,223 ha, 2019 – 833,352 ha and 2020). The dynamics of the indicator reveal that for the years 2018, 2019, and 2020, the component indices consistently exceeded one (100.72%, 102.80%, and 101.35% respectively, followed by 102.64% and 100.54%). However, for the remaining years in the series, the indices were below one, with values of 95.61% and 93.15% in 2021, 93.25% and 97.54% in 2022, and 93.09% and 99.83% in 2023. On a national scale, the region's contribution varied, ranging from 14.58% in 2021 to 15.72% in 2017 (Fig. 1). Of the seven years that make up the dynamic series, in the case of three years, the share of 15% is exceeded (2017, 2018 – 15.64% and 2020 – 15.70%), and for 4 years the share varied between 14 and 15% (2019 – 14.96%, 2021, 2022 – 14.69% and 2023 – 14.70%).

Table 2. Cultivated area – average of the period, structure by species

Specific.	Romania		South-West Oltenia Region		
	Effective ha	Str. %	Effective ha	Str. %	Share at national level (%)
Total	5,294,357.00	100	801,638.71	100	15.14
Wheat	2,164,875.14	40.89	410,157,86	51.16	18.95
Rye	10,845.57	0.21	2,657.29	0.33	24.50
Barley and two-row barley	448,990.00	8.48	56,118.29	7.00	12.50
Oats	118,832.29	2.24	16,341.00	2.04	13.75
Corn grains	2,461,894.71	46.51	300,641.43	37.51	12.21
Sorghum	10,734.57	0.20	1,857.57	0.23	17.31
Rice	5,992.29	0.11	550.43	0.07	9.19
"Other cereals"	72,192.43	1.36	13,314.84	1.66	18.44

Source:own calculation.

As for the average for the period (Table 2), it was, at national level, 5,294,357 ha, presenting the following structure: 46.51% grain corn (2,461,894.71 ha), 40.89% wheat (2,164,875.14 ha), 8.48% barley and barley (448,990 ha), 2.24% oats (118,832.29 ha), 1.36% "other cereals" (72,192.43 ha), 0.21% rye (10,845.57 ha), 0.20% sorghum (10,734.57ha) and 0.11% rice (5,992.29 ha). In the case of the analysed region, the average area cultivated with cereals was 801,638.71 ha, for which the component elements were: 0.07% rice (550.43 ha), 0.23% sorghum (1,857.57 ha), 0.33% rye (2,657.29 ha), 1.66% "other cereals" (13,314.84 ha), 2.04% oats (16,341 ha), 7.0% barley and barley (56,118.29 ha), 37.51% corn grains (300,641.43 ha) and 51.16% wheat (410,157.86 ha).

In the national context, the region contributed with variable weights, by species, to constitute the general level of the indicator.

Thus, we are talking about shares of: below 10% in the case of rice (9.19%); between 10 and 20% for grain corn (12.21%), barley and barley (12.50%), oats (13.75%), sorghum (17.31%), "other cereals" (18.44%), wheat (18.95%); over 20% at rye level (24.50%). At the global level of the crop group, the South-West Oltenia Region held 15.14% of the national cultivated area (Fig. 2).

The information on total production is presented in Table 3.

The total cereal production, at national level, was between 18,153,714 t in 2020 and 31553279 t in 2018. It can be seen that the indicator increased in 2018 compared to 2017 (+16.27% compared to 27,138,884 t), decreased in 2019 compared to the previous year (-3.72%, effective level of 30,412,426 t), a decrease that is also manifested in the following year (2020 – reductions of 32.11 and 40.31% compared to the reporting bases), after which there is an increase for the year 2021 (+2.40 and +53.09% beside the terms of comparison, an effective level of 27,791,258 t), then in 2022 year, the indicator decreases compared to the reference bases (decreases by 30.50 and 32.13%, effective level of 18,860,679 t), following this, in the final term of the dynamic series, the indicator shows an increase compared to the previous year (+10.20%), reaching an actual level of 20,784,656 tons. At the level of the South-West Oltenia Region, the total production ranged from 2,929,924 t in 2022 to 4,653,133 t in 2018. Outside these limits, there are years with total productions between 3 and 4 million tons (3,076,028 t in 2023, 3,211,456 t for 2020 and 3,345,688 t in 2021), as well as years in which the indicator exceeded the threshold of 4 million tons (4,197,585 t in 2019 and 4,330,567 t for 2017). The dynamics of the indicator is dominated by the sub-unit levels of the component indices, the reference terms being exceeded only in 2018 (+7.45%), 2021 (+4.18%) and 2023 (+4.99%).

Table 3. Total production (t)

Anul	Romania			South-West Oltenia Region			
	Effective*	Dynamics **		Effective*	Dynamics **		Share at national level (%)**
		Ibf	Ibm		Ibf	Ibm	
2017	27,138,884	100	100	4,330,567	100	100	15.96
2018	31,553,279	116.27	116.27	4,653,133	107.45	107.45	14.75
2019	30,412,426	112.06	96.38	4,197,585	96.93	90.21	13.80
2020	18,153,714	66.89	59.69	3,211,456	74.16	76.51	17.69
2021	27,791,258	102.40	153.09	3,345,688	77.26	104.18	12.04
2022	18,860,679	69.50	67.87	2,929,924	67.66	87.57	15.53
2023	20,784,656	76.59	110.20	3,076,028	71.03	104.99	14.80

Source:National Institute of Statistics, online data base,*http://statistici.insse.ro:8077/tempo-online/#/pages-table,AGR109A –Agricultural production of vegetable main crops, by property, development regions and counties (26.06.2024) [12].**own calculation.

This situation highlights the fluctuating evolution of the indicators, marked by specific decreases as follows: -3.07 and -9.79% in 2019, -25.84 and -23.49% for 2020, -22.74% in 2021 beside the first term of dynamic series, -32.34 and -12.43% in 2022, -28.97% for the year 2023 relative to the initial term of the dynamic series.

Compared to the national situation, the region contributed to the total production with weights ranging from 12.04% in 2021 to 17.69% in 2020 (Fig. 1). During the analysed period, only three years exceed the 15% threshold (2022 – 15.53%, 2017 – 15.94% and 2020), and 4 years are below it (2023 – 14.80%, 2018 – 14.75%, 2019 – 13.80% and 2021).

If we analyse the total production in terms of the average of the period (Table 4), we find a general national level of 24,956,413.71 t, a level that is based on sequential contributions of: 0.11% rice (28,011.14 t), 0.12% rye (30,143.43 t), 0.17% sorghum (42,237.29 t), 1.08% each oat and "other cereals" (269,485.57 and 270,163.57 t), 7.15% barley and barley (1,783,382.14 t), 37.56% wheat (9,372,880.57 t),52.73% corn grains (13,160,110 t).

At the regional level, the total production, as an average for the period, reached 3,677,768.71 t, for which the component elements were: 48.32% wheat (1,777,226.14 t), 42.68% corn grains (1,569,678.29 t), 6.25% barley and barley (229,916.29 t), 1.40% "other cereals" (51,355.42 t), 0.97% oats (35,841 t), 0.18% rye (6,615.71 t), 0.13% sorghum (4,644.86 t) and 0.07% rice (2,491 t).

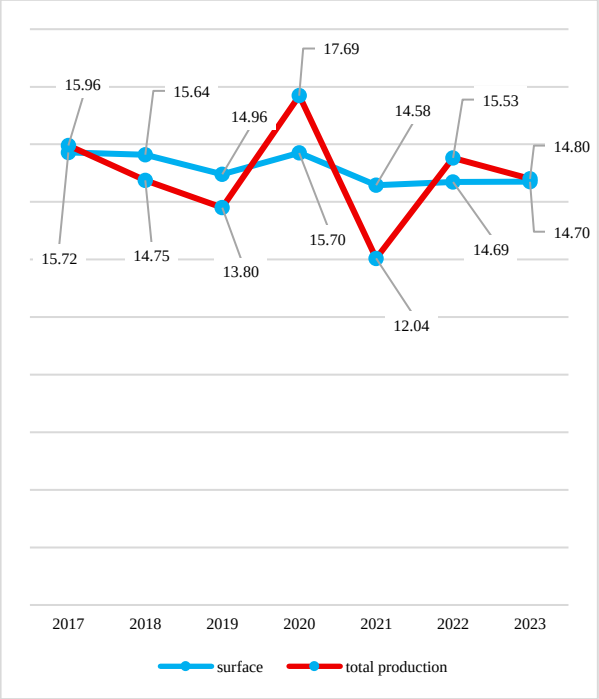

Fig. 1. Cultivated area and total production – regional shares at national level (%)
Source: own calculation.

Compared to the national situation, the region had variable shares, by species, in the direction of achieving the general level of the indicator.

Table 4. The total production – average of the period, structure by species*

Specif.	Romania		South-West Oltenia Region		
	Effect. t	Str. %	Effec. t	Str. %	Share at national level (%)
Total	24,956,413.71	100	3,677,768.71	100	14.74
Wheat	9,372,880.57	37.56	1,777,226.14	48.32	18.96
Rye	30,143.43	0.12	6,615.71	0.18	21.95
Barley and two-row barley	1,783,382.14	7.15	229,916.29	6.25	12.89
Oats	269,485.57	1.08	35,841.00	0.97	13.30
Corn grains	13,160,110.00	52.73	1,569,678.29	42.68	11.93
Sorghum	42,237.29	0.17	46,44.86	0.13	11.0
Rice	28,011.14	0.11	2,491.00	0.07	8.89
"Other cereals "	270,163.57	1.08	51,355.42	1.40	19.01

Source: *own calculation.

Thus, we are talking about shares of: over 20% at rye level (21.95%); between 10 and 20% for sorghum (11.0%), corn grains (11.93%), barley and barley (12.89%), oats (13.30%), wheat (18.96%), "other cereals" (19.01%); less than 10% in the case of rice (8.89%).

As for the total cereal production, the South-West Oltenia Region achieved 14.74% of the national level of the indicator (Fig. 2).

The average production per production unit (kg/ha) is presented in Table 5.

At the national level, general of the plant group, there are positions between 3,400 and 5,999 kg/ha in the case of 2020 and 2018, respectively, the indicator has increased since 2017 (effective level of 5,225 kg) in 2018 by 14.81%, then in 2019 and 2020 there are successive annual decreases of 9.02 and 37.71% (effective levels of 5,458 and 3,400 kg respectively), then in 2021 there is a recovery of the indicator (+52.59% compared to the previous year – effective level of 5,188 kg), followed by a decrease in 2022 (-29.94% - effective level of 3635 kg) and an increase for 2023 (+10.62% - effective level of 4,021 kg).

For the South-West Oltenia Region, the indicator fluctuates between 3,833 kg/ha in 2020 and 5,659 kg/ha in 2018.

The dynamics of the indicator is dominated by the subunit levels of the component indices, while the advances of the terms of comparison were manifested only in 2018 (1.06 times compared to 2017), in 2021 and 2023 (1.11 and 1.05 times compared to the previous terms of the dynamic series).

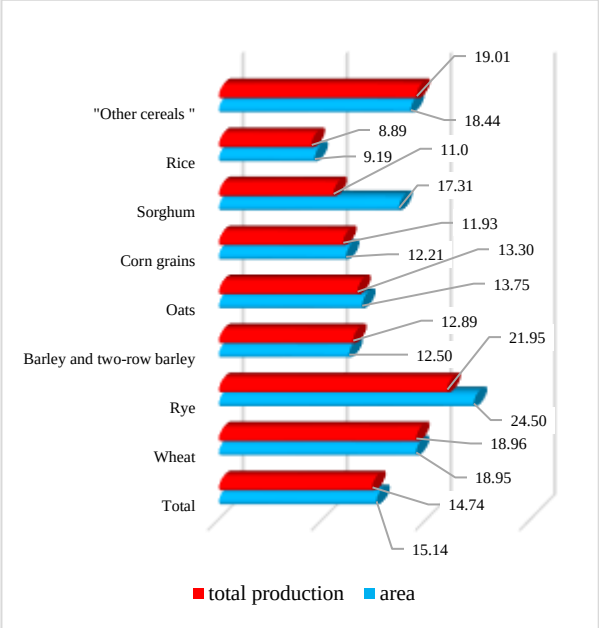

Fig. 2. Cultivated area and total production averages of the period – regional shares at national level by species (%),
Source: own calculation.

Table 5. Average production (kg/ha)

Anul	Romania			South-West Oltenia Region			
	Effective*	Dynamics **		Effective*	Dynamics **		positioning compared to the national level (%)**
		Ibf	Ibm		Ibf	Ibm	
2017	5,225	100	100	5,305	100	100	101.53
2018	5,999	114.81	114.81	5,659	106.67	106.67	94.33
2019	5,458	104.46	90.98	5,037	94.95	89.01	92.29
2020	3,400	65.07	62.29	3,833	72.25	76.10	112.74
2021	5,188	99.29	152.59	4,287	80.81	111.84	82.63
2022	3,635	69.57	70.06	3,849	72.55	89.78	105.89
2023	4,021	76.96	110.62	4,047	76.29	105.14	100.65

Source:National Institute of Statistics, Tempo online data base, *http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table,AGR109A – Vegetable agricultural production for the main crops, by property forms, macro-regions, development regions and counties, Accessed on 26.06.2024[12].**own calculation.

The decreases during the analysed period ranged from small ones (5.05% in the case of 2019 by comparing to the first term), to more significant variations, such as a 27.75% increase in 2020 compared to the 2017 figures.

Compared to the national situation, the region achieved average productions, per productive unit, higher or lower, as follows (Fig. 3): 82.63% in 2021, 92.29% for 2019, 94.33% in 2018, 100.65% in 2023, 101.53% in 2017, 105.89% for 2022 and 112.74% in 2020.

Based on our own calculations, the average levels of the period were determined, at a general level and by cultivated cereal species (Table 6).

As for the national situation, there is a general level of 4,714 kg, a level that was exceeded only by grain corn (+13.41% - 5,346 kg), the

rest of the species being positioned below it: 4,675 kg rice (-0.83%), 4,330 kg wheat (-8.15%), 3,972 kg barley and barley (-15.74%), 3,935 kg sorghum (-16.53%), 3,742 kg "other cereals" (-20.62%), 2,779 kg rye (-41.05%) and 2,268 kg oats (-51.89%) (Fig. 3).

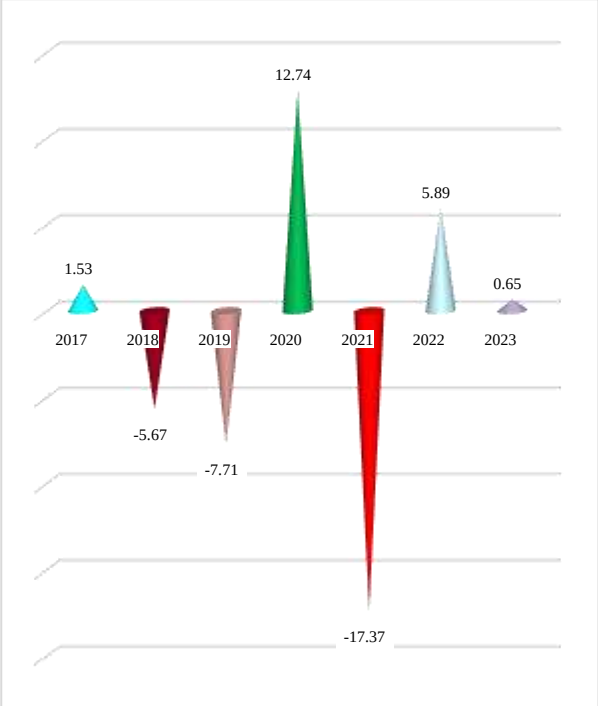

Fig. 3. Average production – the region compared to the national production level (±%)
Source: own calculation.

Table 6. Average production – period average*

Specif.	Romania		South-West Oltenia Region		
	Effect. kg/ha	% in relation to the general level	Effect. kg/ha	% in relation to the general level	positioning when compared to the national level (%)
Total	4,714	100	4,588	100	97.33
Wheat	4,330	91.85	4,333	94.44	100.07
Rye	2,779	58.95	2,490	54.27	89.60
Barley and two-row barley	3,972	84.26	4,097	89.30	103.15
Oats	2,268	48.11	2,193	47.80	96.69
Corn grains	5,346	113.41	5,221	113.80	97.66
Sorghum	3,935	83.47	2,501	54.51	63.56
Rice	4,675	99.17	4,526	98.65	96.81
"Other cereals"	3,742	79.38	3,857	84.07	103.07

Source: *own calculation.

For the South-West Oltenia Region, the general level of the indicator reached 4,588 kg, being surpassed, as at national level, only by grain corn (+13.80% - effective level of 5,221 kg). The relative decreases of the other species, compared to the general regional situation, were 1.35% for rice (4,526 kg), 5.56% for wheat (4,333 kg), 10.40% for barley and barley (4,097 kg), 15.93% for "other cereals" (3,857 kg), 45.49% for sorghum (2,501 kg), 45.73% for rye (2,490 kg), 52.20% for oats (2,193 kg).

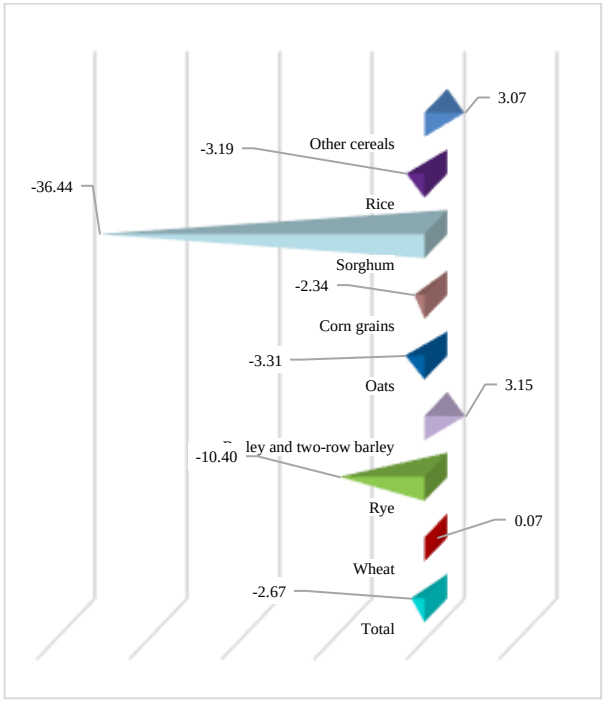

Fig. 4. Average production per hectare, average for the period –
positioning of the region in relation to the national level by species (±%),
Source: own calculation.

If we relate the regional situation to the existing realities at national level, the following can be observed:
- advances of the national situation in the case of wheat, barley and barley respectively for "other cereals" (100.07, 103.15 and 103.07% - Fig. 4);
- below the reference level: 97.66% for grain corn, 97.33% for the crop group, 96.81% for rice, 96.69% for oats, 89.60% for rye, 63.56% for sorghum - Fig. 4).

CONCLUSIONS

From the point of view of the cultivated area, the fluctuating evolution of the indicator at regional level is noted, an aspect that is in line with the national situation. The region held 15.14% of the national cereal area, a share that was exceeded in rye, wheat, "other cereals" and sorghum. In the case of this indicator, the region was placed in the national context as

follows: position 2 for rye and sorghum; position 3 at general level, for wheat, barley and barley, oats, rice; position 4 for grain corn. The total production, both at national and regional level, has evolved unevenly, similar to that manifested for the cultivated area, which may show the existence of a direct correlation between the two indicators. The region accounted for 14.74% of the total national production (-0.40% compared to the share of the area, which indicates a lower level of performance of regional producers compared to the existing state of affairs at national level, an aspect that is found in the case of average production). In terms of shares, within the total production, the regional situation has exceeded the levels recorded for the area of wheat, barley and barley and other cereals, while for the rest of the crops the situation is less favourable, an aspect that can be generated by the technological deficiencies of the producers in the area (in our opinion especially for sorghum), by the lower suitability of the crops to pedo-climatic requirements (see the case of oats, of rye). Nationally, the region ranked as follows: 2nd place for rye and sorghum; 3rd place for total production, wheat, barley, and rice; 4th place for oats; and 5th place for corn.
Regarding average production per hectare, the trends are similar to those observed for the previous indicators, with the region generally performing below the national average in most cases, except for wheat, barley and barley and "other cereals". For this indicator, the region was placed in the national context as follows: position 2 for rice, position 3 for barley and barley, position 4 for wheat, position 5 at general level and for grain corn, position 6 for oats, position 7 for sorghum and position 8 for rye.
We can say that the South-West Oltenia Region is one of the essential areas for cereal production in Romania, but there is a need to improve the results obtained, in order to adequately capitalize on the potential of the area in terms of cultivation and obtaining cereal products.

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