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SOME CONSIDERATIONS REGARDING THE PRIMARY WHEAT SUPPLY IN ROMANIA AND ITS COMPOSITION (2014 – 2016)

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Abstract

The study seeks to establish an anchoring, in time, of the Romanian primary wheat supply, having regard to the importance of the respective product for the Romanian agricultural economy (the second crop plant at national level based on cultivated areas and total yields). In the same context, the importance of wheat crop can be revealed through the role that this product can play as an export item - especially in years characterized by considerable levels of yields. In the period 2014-2016, the levels of the cultivated area and the total production (2,119,062.67 ha and 7,992,788.67 t) are highlighted, but also the less appropriate performance in terms of average production (3,771 kg/ ha). It is worth mentioning that certain aspects that influence the preforms of the respective culture need to be improved: the stronger atomicity of producers, the financing measures (non-reimbursable EU funds not accessible to the large mass of producers), the adequate upgrading of capital items mechanical capital and the upgrading of storage and preservation areas), the protection of certain categories of producers from the sensitive aspects of the market (for example, the evolution of the marketing prices).

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***Key words*:** *wheat, offer, average production, total production, area*

INTRODUCTION

The offer of a product is the amount of goods and services traders want to sell at a certain price [7]. The supply in the agricultural commodity market is scattered and quantitatively irregular [2]. In the long run, the supply of agricultural products is relatively stable depending on the volume of annual agricultural produce, the level of stocks accumulated over time, the impact of agricultural policies, etc. [4].

Wheat is the most important cultivated plant, the largest share food [9]. Wheat is one of the most important cereals grown in Romania and occupies between 22 and 28% of the country's arable land [12].

In Romania, the most favorable areas for wheat are: the Western Plain, the Romanian Plain, the Transylvanian Plain and a part of the Northeast of Moldova [10].

The wheat supply in Romania has seen different trends over time. Thus, for the period 2002-2007, the number of farms that cultivated wheat remained relatively constant, as well as the total area cultivated on the holding [14].

Wheat, as a grain production, is mostly used for human consumption in the form of flour, bakery products or as germs and to a lesser extent for animal feed [8].

In addition to bread and innumerable pastries, wheat can also be used in the manufacture of alcohol, starch, dextrin and glucose [9].

Shredding wheat in a suitable rotation provides convenient premises for obtaining the right produce. As a result, every time the wheat is sown after peas, considered a good predecessor to the recovery of peas [3].

At present, the total wheat production obtained in Romania ensures internal consumption and gives the possibility to export significant quantities of this culture [6].

Wheat is a current marketable product on the agrarian market. About 15% of total world cereal production and over 18% of wheat production are the subject of international trade. Wheat accounts for about 45% of world cereal trade [13].

The paper shows how the wheat production is

distributed in the territory. From this point of view, it is intended to highlight the relative importance played by each macro region and development region.

MATERIALS AND METHODS

For the purpose of drafting the paper, it is aimed at the creation at national level of the primary supply: cultivated area (ha), total production (t) and average production (kg/ha), for the period 2014-2016.

This highlights the macroregional and regional contributions as follows: Macroregion 1 consisting of the North West Region and the Central Region; Macroregion 2 consisting of the North East Region and the South East Region; Macroregion 3 consisting of South Muntenia Region and Bucharest-Ilfov Region; Macroregion 4 composed of the South West Oltenia Region and the West Region.

The method of analysis used is the comparison. The comparison method evaluates the results obtained and compares them with certain reference bases. Comparisons are done over time, in space and mixed [1].

The paper used indices analysis, comparison over time being highlighted through the mobile base index, calculated by formula: $I_{bm} = \frac{Y_n}{Y_{n-1}} x100$, in which: Y_n - the level of indicator for each component of the dynamic series; Y_{n-1} - the level of temporal sequence indicator considered as a basis for comparison or reference period . It starts from the national, macro-regional and regional level of the indicators, determining the structure indices (for the cultivated area and the total production). In the case of average production, the macroregional and regional levels are reported at the national level of the indicator, with a position towards it being established.

In order to establish a correlation between cultivated area and total production, we used it:

- equation for the correlation coefficient:

$$Correl(X,Y) = \frac{\sum (x-\bar{x})(y-\bar{y})}{\sqrt{\sum (x-\bar{x})^2 \sum (y-\bar{y})^2}}$$

$\bar{x}$ şi $\bar{y}$ - are the averages for samples, average (matrix1) and average (matrix2);

RESULTS AND DISCUSSIONS

The cultivated area. Data extracted from the site [15], refers to the evolution of the cultivated area (on the three reference levels - national, macroregional and regional) and is presented in Table 1.

In the case of 2014, a total area of 2,112,866 ha was cultivated, characterized by the following structure:

- 31.49% Macro-region 2 (665,414 ha total area of which 507,013 ha in the South East respectively 23.99% and 158,401 ha for the North East - 7.50%);
- 29.55% Macroregion 4 (a total area of 624,280 ha, which at regional level was divided as follows: 11.47% in the West and 18.08% in the South West, 242,244 and 382,036 ha respectively);
- 28.82% Macroregion 3 (608,942 ha distributed 590,583 ha for South Muntenia 27.95% and 18,359 ha for the Bucharest-Ilfov region 0.87% respectively);
- 10.14% Macroregion 1 (total cultivated area of 214,230 ha, with 5.82% for North West and 4.32% for Center, corresponding to areas 122,922 and 91,308 ha).

At the level of 2015, the structure of the national area (2,106,591 ha) was as follows:

- 11.21% Macroregion 1 (total cultivated area of 236,133 ha, distributed in the two component regions: 89,519 ha Center and 146,614 ha North West, actual values that determined weights of 4.25 and 6.96% respectively);
-28.41% Macroregion 4 (598,571 ha cultivated area, while the regions of West and South West Oltenia held shares of 11.14 and 17.27%, starting from 234,756 and 363,815 ha);
-28.67% Macroregion 3 (total area of 603,965 ha, for which the component regions contributed 18,531 and 585,434 ha respectively - Bucharest-Ilfov and South Muntenia - so that the structural weights were

0.88 and 27.79% at national level);
-31.71% Macroregion 2 (667,922 ha total area, with the percentage contributions being 7.98 and 23.73% on the basis of the actual values of the 168,028 ha for North East and 499,894 ha for the South East).

Table 1. Area cultivated with cereals (ha)

Specification	Year								Average**		
	2014		2015			2016					
	Eff. *	Str. (%)**	Eff. *	Str. (%)**	2015/ 2014**	Eff. *	Str. (%)**	2016/ 2015**	Eff.	Str. (%)	average/ 2016
Total	2,112,866	100	2,106,591	100	99.70	2,137,731	100	101.48	2,119,062.67	100	99.13
Macro region 1	214,230	10.14	236,133	11.21	110.22	235,339	11.01	99.66	228,567.33	10.79	97.12
Region North West	122,922	5.82	146,614	6.96	119.27	144,662	6.77	98.67	138,066.00	6.52	95.44
Region Centre	91,308	4.32	89,519	4.25	98.04	90,677	4.24	101.29	90,501.33	4.27	99.81
Macro region 2	665,414	31.49	667,922	31.71	100.37	647,598	30.29	96.96	660,311.34	31.16	101.96
Region North East	158,401	7.50	168,028	7.98	106.08	167,812	7.85	99.87	164,747.00	7.77	98.17
Region South East	507,013	23.99	499,894	23.73	98.59	479,786	22.44	95.98	495,564.34	23.39	103.29
Macro region 3	608,942	28.82	603,965	28.67	99.18	606,413	28.37	100.40	606,440.00	28.62	100.01
Region South Muntenia	590,583	27.95	585,434	27.79	99.13	588,039	27.51	100.44	588,018.67	27.75	99.99
Region Bucharest Ilfov	18,359	0.87	18,531	0.88	100.94	18,374	0.86	99.15	18,421.33	0.87	100.26
Macro region 4	624,280	29.55	598,571	28.41	95.88	648,381	30.33	108.32	623,744.00	29.43	96.20
Region South West Oltenia	382,036	18.08	363,815	17.27	95.23	399,710	18.70	109.87	381,853.67	18.02	95.53
Region West	242,244	11.47	234,756	11.14	96.90	248,671	11.63	105.93	241,890.33	11.41	97.27

*http://statistici.insse.ro/shop/ (24.07.2017)
** own calculation

The year 2016 is characterized by a total national area of 2,137,731 ha to which development regions contributed as follows: 27.51% South Muntenia (588,039 ha), 22.44% South East (479,786 ha), 18.70% South West Oltenia (399,710 ha), 11.63% West (248,671 ha), 7.85% North East (167,812 ha), 6.77% North West (144,662 ha), 4.24% Center (90,677 ha) and 0.86% Bucharest-Ilfov (18,374 ha). As a result of these situations, at macroregional level we can find variable weights from 11.01% for Macroregion 1 (235,339 ha) to 30.33% for Macroregion 4 (648,381 ha). The other two macro-regions had contributions of 28.37 and 30.29% (3 and 2 respectively) as a result of actual levels of the cultivated areas of 606,413 and 647,598 ha, respectively.
The average of the analyzed period was 2,119,062.67 ha highlighting variable structures at macroregions and development regions:
-31.16% Macroregion 2, 29.43% Macroregion 4, 28.62% Macroregion 3, 10.79% Macroregion 1 (660,311.34, 623,744, 606,440 and 228,567.33 ha);
- 0.87% Bucharest-Ilfov Region (18,421.33 ha), 4.27% Central Region (90,501.33ha), 6.52% North West Region (138,066 ha), 7.77% North East Region (164,747 ha), 11.41% West Region (181,890.33 ha), 18.02% Region South West Oltenia (381,853.67 ha), 23.39% South East Region (495,564.34 ha), 27.75% South Muntenia Region (588,018.67 ha), Figure 1.
Total production. Wheat acreage nationwide is an important factor that directly influences the production realized by farmers [11].
Table 2, according to the site [15], the data are shown for the total production.

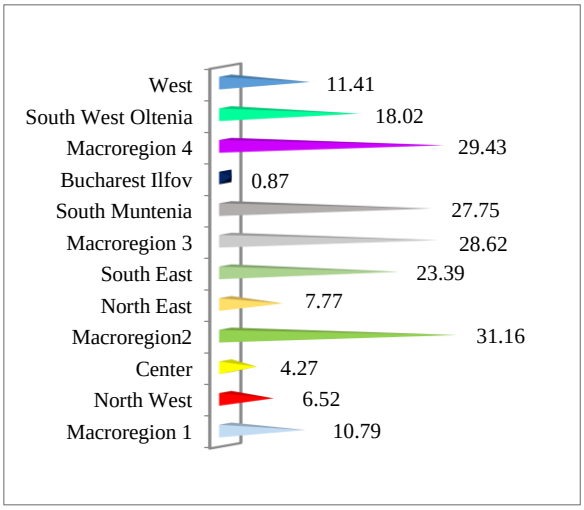

Fig. 1.Cultivated surface - macro-regional and regional structure, period average (2014-2016)

In the case of 2014, when total national production was 7,584,814 t, the structural weights (by regions and macro regions) reached:

-30.28% Macroregion 2 - 2,296,563 t (weights of 23.30 and 6.98% for the South East and North East, 1,767,518 and 529,045 t respectively);

-30.15% Macroregion 3 - 2,286,473 t (29.17% South Muntenia and 0.98% Bucharest-Ilfov, starting from the actual levels of 2,212,388 and 74,085 t respectively);

-28.89% Macroregion 4 - 2,191,580 t (16.10% South West Oltenia and 12.79% West, actual production of 1,221,507 t and 970,073 t, respectively);

- 10.68% Macroregion 1 – 810,198 t (6.23% North West and 4.45% Center, which was based on productions of 472,422 and 337,776 t respectively).

Table 2. Total cereal production (t)

Specification	Year								Average**		
	2014		2015			2016					
	Eff.*	Str. (%)**	Eff.*	Str. (%)**	2015/ 2014**	Eff.*	Str. (%)**	2016/ 2015**	Eff.	Str. (%)	average/ 2016
Total	7,584,814	100	7,962,421	100	104.98	8,431,131	100	105.89	7,992,788.67	100	94.80
Macro region 1	810,198	10.68	904,947	11.37	111.69	833,039	9.88	92.05	849,394.67	10.63	101.96
Region North West	472,422	6.23	570,476	7.17	120.76	488,888	5.90	85.69	510,595.34	6.39	104.44
Region Centre	337,776	4.45	334,471	4.20	99.02	344,151	4.08	102.89	338,799.33	4.24	98.44
Macro region 2	2,296,563	30.28	2,359,482	29.63	102.74	2,621,451	31.09	111.10	2,425,832.00	30.35	92.54
Region North East	529,045	6.98	509,032	6.39	96.22	605,596	7.18	118.97	547,891.00	6.86	90.47
Region South East	1,767,518	23.30	1,850,450	23.24	104.69	2,015,855	23.91	108.94	1,877,941.00	23.49	93.16
Macro region 3	2,286,473	30.15	2,443,208	30.68	106.85	2,493,160	29.57	102.04	2,407,613.67	30.12	96.57
Region South Muntenia	2,212,388	29.17	2,364,796	29.70	106.89	2,416,773	28.66	102.19	2,331,319.00	29.17	96.46
Region Bucharest Ilfov	74,085	0.98	78,412	0.98	105.84	76,387	0.91	97.42	76,294.67	0.95	99.88
Macro region 4	2,191,580	28.89	2,254,784	28.32	102.88	2,483,481	29.46	110.14	2,309,948.33	28.90	93.01
Region South West Oltenia	1,221,507	16.10	1,209,997	15.20	99.06	1,325,051	15.72	109.51	1,252,185.00	15.67	94.50
Region West	970,073	12.79	1,044,787	13.12	107.70	1,158,430	13.74	110.88	1,057,763.33	13.23	91.31

*http://statistici.insse.ro/shop/ (24.07.2017)
** own calculation

At the level of 2015, the structure of national production (7,962,421 t) was as follows:

- 11.37% Macroregion 1 - 904.947 t (4.20% Center and 7.17% North West, weights resulting from total regional productions of 334,471 and 570,476 t respectively);

- 28.32% Macroregion 4 - 2,254,784 t (13.12% West and 15.20% South West Oltenia, percentages based on actual levels of the indicator of 1,044,787 and 1,209,997 t in

the situation of the two regions);
- 29.63% Macroregion 2 - 2,359,482 t (23.24% South East and 6.39% North East, with total outputs of 1,850,450 and 509,032 t respectively);
- 30.68% Macroregion 3 - 2,443,208 t (0.98% Bucharest-Ilfov and 29.70% South Muntenia, based on total production of 78,412 and 2,364,796 t respectively).
For the year 2016, variable rates of the Macroregions were recorded at national level, from 9.88% for Macroregion 1 (833.039 t) to 31.09% for Macroregion 2 (2,621,451 t), while for the other two macro-regions finds 29.46 and 29.57% respectively Macroregion 4 (2,483,481 t) and Macroregion 3 (2,493,160 t). At the level of the development regions, variation limits from 4.08% for the Central Region (344,151 t) to 28.66% for the South Muntenia Region (2,416,773 t) are found.

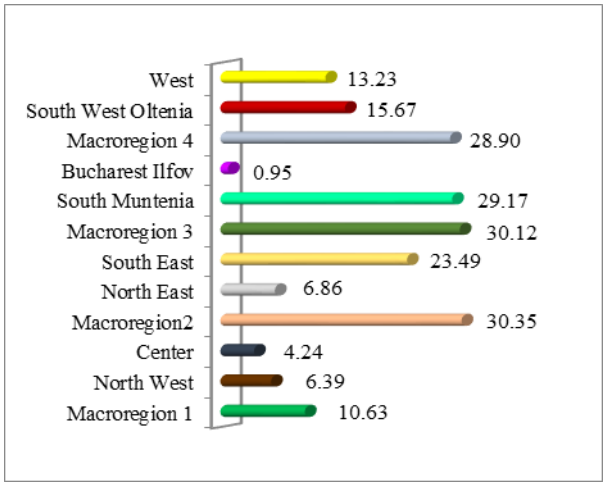

Fig. 2.Total cereal production - structure macro-regional and regional, period average (2014-2016)

For the analyzed period, the average total production (8,493,394.67 t) points out, on macroregions and development regions, variable structure as follows:
- the macro-region structure is as follows: 30.35% Macroregion 2 (2,425,832 t), 30.12% Macroregion 3 (2,407,613.67 t), 28.90% Macroregion 4 (2,309,948.33 t), 10.63% Macroregion 1 (849,394.67 t);
- the structure by regions was: 0.95% Bucharest-Ilfov (76,249.67 t), 4.24% Center (338,799.33 t), 6.39% North West (510,595.34 t), 6.86% North East (547.891 t) , 15.67% South West Oltenia (1,252,185 t), 23.49% South East (1,877,941 t), 29.17% Sud Muntenia (2,331,319 t) - Figure 2.

Average production. Romania has the lowest yield of production in the EU, there have been years (2011, for example), in which the yield has been more than half of that of the EU [5].
Table 3 contains information on the evolution of average production (kg/ha) conform [15].
For the year 2014, variable weights of the Macroregions are observed at national level, from 96.13% for Macroregion 2 (3,451 kg/ha) to 105.35% for Macroregion 1 (3,782 kg/ha), while for the other two Macroregions 97.80 and 104.60% respectively Macroregion 4 and Macroregion 3 (3,511 and 3,755 kg/ha) are recorded, if compared to the 3,590 kg/ha recorded at national level. Regarding the situation on development regions, positioning limits from 89.05% for South West Oltenia (3,197 kg/ha) to 112.40% for Bucharest-Ilfov (4,035 kg/ha) are found.
The year 2015 is characterized by a national level of the indicator of 3,780 kg/ha, against which macro-regions and development regions were positioned as follows:
- 107.01% Macroregion 3 - 4,045 kg/ha (111.93% Bucharest-Ilfov and 106.85% South Muntenia, actual levels of 4,231 and 4,039 kg/ha respectively);
- 101.38% Macroregion 1 – 3,832 kg/ha (102.94% North West and 98.84% Center due to actual levels of 3,891 and 3.736 kg/ha respectively);
- 99.66% Macroregion 4 – 3,767 kg/ha (117.75% West and 87.99% South West Oltenia, based on average yields per hectare of 4,451 and 3,326 kg respectively);
- 93.47% Macroregion 2 – 3,533 kg/ha (97.94% South East and 80.13% North East, actual levels of 3,702 and 3,029 kg/ha respectively).
In 2016, compared to the national average (3,944 kg/ha), macro-regions and regions are positioned as follows:
-89.76% Macroregion 1 - 3,540 kg/ha (85.70% North West and 96.22% Center due to average production levels per hectare of 3,380 and 3,795 kg/ha respectively);
-97.11% Macroregion 4 - 3.830 kg/ha (84.05% South West Oltenia and 118.10% West on the basis of the actual levels of 3.315

and 4.658 kg/ha respectively);
-102.64% Macroregion 2 - 4,048 kg/ha (106.54% South East and 91.51% North East, starting from the actual levels of the indicator 4.202 and 3.609 kg/ha respectively);
-104.23% Macroregion 3 – 4,111 kg/ha (104.21% South Muntenia and 105.40% Bucharest-Ilfov, actual levels of 4,110 and 4,157 kg/ha respectively).

Table 3. Cereal average yield (kg/ha)

Specification	Year								Average**		
	2014		2015			2016					
	Eff.*	% compared to the national level**	Eff.*	% compared to the national level**	2015/ 2014**	Eff.*	% compared to the national level**	2016/ 2015**	Eff.	% compared to the national level**	average/ 2016
Total	3,590	100	3,780	100	105.29	3,944	100	104.34	3,771	100	95.61
Macro region 1	3,782	105.35	3,832	101.38	101.32	3,540	89.76	92.38	3,718	98.59	105.03
Region North West	3,843	107.05	3,891	102.94	101.25	3,380	85.70	86.87	3,705	98.25	109.62
Region Centre	3,699	103.04	3,736	98.84	101.00	3,795	96.22	101.58	3,743	99.26	98.63
Macro region 2	3,451	96.13	3,533	93.47	102.37	4,048	102.64	114.58	3,677	97.51	90.83
Region North East	3,340	93.04	3,029	80.13	90.69	3,609	91.51	119.15	3,326	88.20	92.16
Region South East	3,486	97.10	3,702	97.94	106.19	4,202	106.54	113.51	3,797	100.69	90.36
Macro region 3	3,755	104.60	4,045	107.01	107.72	4,111	104.23	101.63	3,970	105.28	96.57
Region South Muntenia	3,746	104.35	4,039	106.85	107.82	4,110	104.21	101.76	3,965	105.14	96.47
Region Bucharest Ilfov	4,035	112.40	4,231	111.93	104.86	4,157	105.40	98.25	4,141	109.81	99.62
Macro region 4	3,511	97.80	3,767	99.66	107.29	3,830	97.11	101.67	3,703	98.20	96.68
Region South West Oltenia	3,197	89.05	3,326	87.99	104.03	3,315	84.05	99.67	3,279	86.95	98.91
Region West	4,005	111.56	4,451	117.75	111.14	4,658	118.10	104.65	4,371	115.91	93.84

*http://statistici.insse.ro/shop/ ((24.07.2017)
** own calculation

The national average of the analyzed period (3,771 kg) signals variable positions on Macroregions and Development Regions, as follows:
- for Macroregions the situation is as follows: 105.28% Macroregion 3, 98.59% Macroregion 1, 98.20% Macroregion 4, 97.51% Macroregion 2 (actual macroregional levels of 3,970, 3,718, 3,703 and 3,677 kg/ha respectively);
- positioning on Development Regions is as follows: 89.95% South West Oltenia (3,279 kg/ha), 88.20% North East (4,326 kg/ha), 98.25% North West (3,705 kg/ha), 99.26% Center (3,743 kg/ha), 100.69% South East (3,797 kg/ha), 105.14% South Muntenia (3,965 kg/ha), 109.81% Bucharest-Ilfov (4,141 kg/ha) - Figure 3.

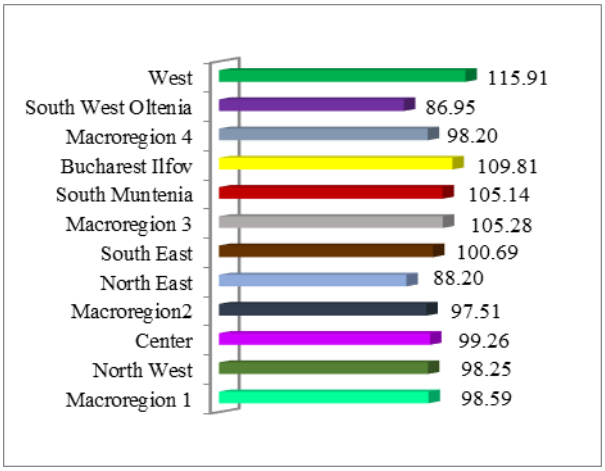

Fig. 3. Average yield - Macro regions and Regions of developing, position to the national situation (%), period average (2014-2016)

CONCLUSIONS

The cultivated area is characterized by a non-uniform evolution (amplitude of 1.78% - 31,140 ha and 1.46% of the average of the

indicator - relatively insignificant variation), characteristic of all regions and macroregions, with the exception of the South Est Region where the evolution was strictly descending. As such, some degree of uniformity of the indicator may be observed.

Romania manifests itself as an important cultivator at the continental and regional (EU) level, accounting for approximately 3.5 and 8% respectively (weights are based on 2014 data for Europe and the EU) [16].

The total output has grown upward at national level (amplitude of 5.89%, 846,317 t, ie 10.59% of indicator average - somewhat appreciable difference). Similar issues are found for Macroregion 2, South East Region, Macroregion 3, South Muntenia Region, Macroregion 4 and West Region. In the rest there are non-uniform evolutions.

At continental and regional level, Romania achieved about 3.2 and 5% of total production [16], less convenient situation (less weights than those registered for the cultivated area, situation resulting from the weaker results, due to the technological, capitalization, etc. specific to the Romanian producers);

The correlation between the cultivated area and the total production is evidenced by the values of the correlation coefficient (r = 0.999039) and the grade 2 polynomial function (R^2 = 0.9981), values based on the levels of the two indicators for the average of the analyzed period. These situations signal the direct correlation between the two phenomena;

The average yield per hectare has been on a nationwide upward trend (variation amplitude of 354 kg - 9.38% in relative values, significant variation). Similar situations arise for the Central Region, Macroregion 2, South East Region, Macroregion 3, South Muntenia Region, Bucharest-Ilfov and West Region. The rest of the analyzed units show an uneven trend.

It is noteworthy that in the regional and continental context, Romania achieved about 89% and 64%, respectively, of the reference levels [16].

The macro-region 1 has a secondary role in influencing national levels of total wheat production, with some balance between the other macro-regions (2.64% for cultivated area and 1.45% for total production). As a result, wheat is a culture that at national level has an increased adaptability to characteristic agro-productive conditions;

Wheat represents an important crop for Romania (the second one for corn), generating a favorable economic aspect at the level of the local producers, especially in the conditions of favorable climatic and economic conjuncture. Hence the need to apply appropriate measures to protect producers in order to adequately exploit the existing national potential.

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