

## SOME CONSIDERATIONS CONCERNING THE ROMANIAN PRODUCTION OF MAIZE IN EUROPEAN CONTEXT (2012 - 2014)

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### **Abstract**

*Romania is recognized both in the world and at European level as a major country cultivating cereals. The area occupied by corn indicates the importance of culture for Romania, which is given by the yield per hectare relative to wheat, its food and feed value, as well as the relatively simple technology, suitable for mechanization and easy to substitute for living labor. It is noticed that Europe held 10.15% of the world's surface. The indicator has recorded a non-uniform evolution at continental level. The European total maize production represents 11.73 % of the global output. The evolution of the indicator shows an upward trend for all the analyzed areas, except for Northern Europe with fluctuating evolution. In the global context, it is noticed that Europe has exceeded the average world production by 15.44%. Romania appears as a great cultivator at European level, but this positive aspect is not supported by high performance levels.*

**Key words:** maize, cultivated area, total production, average production

### **INTRODUCTION**

Corn is, besides wheat, rice, soybean, one of the most important plants cultivated by man [5].

Due to the high ecological plasticity, corn is found almost anywhere in the world on the five continents, its spreading area reaching the northern hemisphere of 53<sup>0</sup> north latitude (in Canada and the Russian Federation) and the southern to 42-43<sup>0</sup> south latitude in New Zealand [1].

Maize can be grown on soils and under very different climatic conditions, it is not pretentious to the pre-plant and it carries the monoculture better than other cereals [8].

Romania is recognized as a major cultivating country in the world and European markets [2]. In this context, the approach of the proposed theme is justified.

Maize has traditionally occupied the largest area in Romanian agriculture and continues to occupy, along with wheat, over one third of the cultivated area [9].

The area occupied by corn indicates the importance of culture for Romania, which is given by the yield per hectare relative to wheat, by the bivalent, food and feed value, as well as by a relatively simple technology, suitable for

mechanization and easily substituted by living labor [7].

Other authors point out that the importance and economic benefits of maize production derive from the versatility of its use or use: fodder, industrial, agro-technical technology, export article and source of profit for agricultural holdings [4].

Obtaining optimal economic yields is largely influenced by the judicious choice of the most suitable hybrids for each crop area [6].

### **MATERIALS AND METHODS**

The information required for writing the paper was collected by accessing the databases with increased visibility [10].

The indicators used (area cultivated, total production and average production) refer to the period 2012-2014, and for the construction of the dynamic series, the average of the period.

The methods used in designing and editing were the documentation, the comparison, the percentage method. It was used as the comparison method based on the use of mobile base index calculated by formula:  $I_{bm} =$

$\frac{Y_n}{Y_{n-1}} \times 100$ , 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 [3].

Table 1 contains information on the evolution and structure of the area planted with maize at continental, zonal and national levels for the period 2012-2014 [10].

## RESULTS AND DISCUSSIONS

Table 1. The area cultivated with maize (ha)

Specification	Year									Average		
	2012			2013			2014			Eff. **	Din. average/ 2014**	Str. %**
	Eff. *	Din. **	Str. %**	Eff. *	Din. 2013/ 2012**	Str. %**	Eff. *	Din. 2014/ 2013**	Str. %**			
Europe	18,090,827	100	100	18,843,603	104.16	100	18,751,055	99.51	100	18,561,828.33	98.99	100
Eastern Europe	12,221,185	100	67.55	12,926,329	105.77	68.60	12,900,335	99.80	68.80	12,682,616.33	98.31	68.33
Northern Europe	25,800	100	0.14	30,000	116.28	0.16	29,100	97.0	0.15	2,830.00	9.25	0.15
Southern Europe	3,278,975	100	18.13	3,243,520	98.92	17.21	3,184,281	98.17	1.98	3,235,592.00	101.61	17.43
Western Europe	2,564,867	100	14.18	2,643,754	103.08	14.03	2,637,339	99.76	1.07	261,5320.00	99.17	14.09
European Union	9,850,438	100	5.45	9,765,328	99.14	5.80	9,618,499	98.50	5.30	9,744,755.00	10.31	52.50
Romania	2,722,180	100	1.05	2,515,541	92.41	13.35	2,504,419	99.56	13.36	2,580,713.33	103.05	13.90

\* <http://www.fao.org/faostat/fr/#data/QC> (18.12.2016)

\*\* own calculation

In 2012, the continental surface reached 18,090,827 ha, an area which increased by 4.16% in 2013 (an actual level of 18,843,603 ha), then the indicator declined in 2014 by 0.49% (18,751,055 ha), so that the average of the period reached 18,561,828.33 ha (98.99% - in dynamics).

At the level of Eastern Europe, the average of the indicator was 12,682,616.33 ha (-1.69% in dynamics), with extreme values of 12,221,185 ha in 2012 and 12,926,329 ha for 2013. There is a non-uniform trend of the indicator for the period analyzed.

Northern Europe cultivated 25,800 to 30,000 ha of maize (2012 and 2013 respectively), so the average of the period reached 28,300 ha. The dynamics of the indicator is fluctuating, with annual benchmarking of 1.16 times in 2013, and declines of 3.0 and 2.75% for 2014 and the average of the period.

For South Europe, an average of 3,235,592 ha has been recorded, which is based on yearly areas of 3,278,975 ha in 2012, 3,243,520 ha for 2013 (-1.08%) and 3,184,281 ha for 2014 (-1.83%).

Western Europe is characterized by a variable total cultivated area, from 2,564,867 ha in 2012 (baseline) to 2,643,754 ha in 2013 (+3.08%). Under these conditions (2,637,339 ha in 2014),

the average of the period reached 2,615,320 ha (-0.83% in dynamics). As such, it can be said that the indicator recorded a strictly uneven trend.

For the European Union, the minimum indicator level was 9,618,499 ha in 2014 and the maximum level was in 2012 (9,850,438 ha). The average of the period reached 9,744,755 ha (+1.31% in dynamics), due to the specific area of 2013 (9,765,328 ha).

Romania cultivated from 2,504,419 hectares to 2,722,180 ha in 2014 and 2012 respectively. The area evolved in descending order (decreases of 7.59 and 0.44% in 2013 and 2014 respectively). The average of the period reached 2,580,713.33 ha (+3.05% over the reporting period).

The structure of the cultivated surface is presented below. The year 2012 is characterized by the following structure: 67.55% Eastern Europe; 18.13% Southern Europe; 14.18% Western Europe; 0.14% Northern Europe. In 2013 the structure of the continental surface was as follows: 68.60% Eastern Europe; 17.21% Southern Europe; 14.03% Western Europe; 0.16% Northern Europe. For 2014, continental levels vary from 0.15% for Northern Europe to 68.80% for Eastern Europe, while for the other two areas

there are weights of 16.98 and 14.07% respectively in Southern Europe and Western Europe. The average of the analyzed period (18,561,828.33 ha) shows variable structures per zone, as follows: 68.33% eastern area, 17.43% southern area, 14.09% western area, 0.15% northern area.

For the European Union, variable weights are observed at continental level from 51.30% for 2014 to 54.45% for 2012.

Romania has grown an average of 13.90% of the European area, with 13.35% in 2013 and 15.05% respectively in 2012.

Table 2 contains information on the evolution and structure of total maize production at continental, zonal and national levels for the period 2012-2014 [10].

Table 2. Total maize production (t)

Specification	Year									Average		
	2012			2013			2014			Eff. **	Din. average / 2014**	Str. %**
	Eff. *	Din. **	Str. %**	Eff. *	Din. 2013/2012*	Str. %**	Eff. *	Din. 2014/2013*	Str. %**			
Europe	95,219,230	100	100	119,368,487	125.36	100	129,426,058	108.43	100	114,671,258.33	88.60	100
Eastern Europe	49,229,352	100	51.70	71,762,060	145.77	60.12	73,540,472	102.48	56.82	64,843,961.33	88.17	56.55
Northern Europe	153,900	100	0.16	202,900	131.84	0.17	187,900	92.61	0.15	181,566.67	96.63	0.16
Southern Europe	21,314,622	100	22.39	25,207,883	118.27	21.12	28,703,509	113.87	22.18	25,075,338.00	87.36	21.87
Western Europe	24,521,356	100	25.75	22,195,644	90.52	18.59	26,994,177	121.62	20.85	24,570,392.33	91.02	21.43
European Union	59,812,047	100	62.82	66,947,966	111.93	56.09	78,031,689	116.56	60.29	68,263,900.67	87.48	59.53
Romania	5,953,352	100	6.25	11,305,095	189.89	9.47	11,988,553	106.04	9.26	9,749,000.00	81.32	8.50

\*<http://www.fao.org/faostat/fr/#data/QC> (18.12.2016)

\*\* own calculation

In 2012, continental production reached 95,219,230 t, production, which increased by 25.36% in 2013 (119,368,487 t), then the indicator increased by 8.43% (129,426,058 t) in 2014, so that the average of the period reached 114,671,258.33 t (88.60% - in dynamics).

At the level of Eastern Europe, the average of the indicator was 64,843,961.33 t (-11.83% in dynamics), with extreme values of 49,229,352 t in 2012 and 73,540,472 t for 2014. There is an upward trend of the indicator for the analyzed period.

Northern Europe obtained between 153,900 and 202,900 tons of maize (2012 and 2013 respectively), so that the average of the period reached 181,566.67 t. The dynamics of the indicator is fluctuating, the annual yields of the terms of reference being 1.31 times in 2013, and declines were 7.30 and 3.37% for 2014 and the average for the period respectively.

For South Europe, an average production level of 25,075,338 tones is established, based on annual yields of 21,314,622 tons in 2012,

25,207,883 tones for 2013 (+18.27%) and 28,703,509 tons for 2014 (+13.87%).

Western Europe is characterized by total variable production, from 22,195,644 t in 2013 (-9.48% in dynamics) to 26,994,177 t in 2014 (+21.62%). Under these conditions (24,521,356 t in 2012), the average of the period reached 24,570,392.33 t (-8.98% in dynamics). As such, it can be said that the indicator recorded an uneven trend.

For the European Union, the minimum level of the indicator was 59,812,047 t in 2012 and the maximum level was in 2014 (78,031,689 t). The average of the period reached 68,263,900.67 t (-12.52% in dynamics), and as a result of 2013 production (66,947,966 t).

For Romania there is an average of 9,749,000 t (-18.68% compared to 2014), with variation limits of 5,953,352 t in 2012 and 11,988,553 t in 2014 respectively. The indicator ascended (+89.89 and +6.04% in dynamics).

Regarding the zonal structure of total production, a series of considerations can be made. The year 2012 is characterized by the

following structure: 51.70% Eastern Europe; 25.75% Western Europe; 22.39% Southern Europe; 0.16% Northern Europe. In 2013 the structure of continental production was as follows: 60,12% Eastern Europe; 21,12% Southern Europe; 18.59% Western Europe; 0.17% North Europe. For 2014, continental levels vary from 0.15% for Northern Europe to 56.82% for Eastern Europe, while for the other two areas 22.18 and 20.85% respectively in South and Western Europe. The average of the analyzed period (114,671,258.33 t) shows variable structures per area, as follows: 56.55% Eastern, 21.87% Southern, 21.43% West, 0.16% North.

For the European Union, weights vary from 56.09% for the year 2013 to 62.82% for the year 2012.

At the national level, the weights registered in the European context reached: 6.25, 9.47, 9.26 and 8.50% for the four dynamic components of the dynamic series (2012, 2013, 2014 and the average of the period respectively).

Table 3 contains information on the evolution and positioning of average yield (kg/ha) of maize at continental, zonal and national levels for the period 2012-2014 [10].

Table 3. Average maize production (kg/ha)

Specification	Year									Average		
	2012			2013			2014			Eff. **	Din. media/ 2014**	positioning towards the continental level (%)**
	Eff.*	Din. **	positioning towards the continental level (%)**	Eff.*	Din. 2013/ 2012**	positioning towards the continental level (%)**	Eff.*	Din. 2014/ 2013**	positioning towards the continental level (%)**			
Europe	5,263	100	100	6,335	120.37	100	6,902	108.95	100	6,167	89.35	100
Eastern Europe	4,028	100	76.53	5,552	137.84	87.64	5,701	102.68	82.60	5,094	89.35	82.60
Northern Europe	5,965	100	113.34	6,763	11.38	106.76	6,457	95.48	93.55	6,395	99.04	103.70
Southern Europe	6,500	100	123.50	7,772	119.57	122.68	9,014	115.98	130.60	7,762	86.11	125.87
Western Europe	9,561	100	181.66	8,396	87.82	132.53	10,235	121.90	148.29	9,397	91.82	152.39
European Union	6,072	100	115.37	6,856	112.91	108.22	8,113	118.33	117.55	7,014	86.45	113.74
Romania	2,187	100	41.55	4,494	205.49	70.94	4,788	106.54	69.37	3,778	78.91	61.26

\*<http://www.fao.org/faostat/it/#data/QC> (12.12.2016)

\*\* own calculation

Average production per hectare continental ranged from 5,263 kg in 2012 to 6,902 kg in 2014, while the average of the period reached 6,167 kg. The dynamics of the indicator is an upward trend, the overruns of the reporting bases being 1.20 times in 2013 and 1.08 times for the year 2014, while for the average of the period there is a decrease of 10.65% compared to the comparison term.

Eastern Europe is characterized by an increasing evolution of the indicator, from 4,028 kg in 2012 to 5,552 kg in 2013 (+37.84%), to 5,701 kg in 2015 (+2.68%). Under these circumstances, the average of the period was lower than the comparison term, with 10.65% (5,094 kg).

Concerning the current situation in North Europe, there is an average of 6,395 kg

(-0.96% in dynamics) as well as a variable trend of the indicator as follows: 5,965 kg in 2012, 6,763 kg in the year 2013 (+13.38%), 6,457 kg for the year 2015 (-4.52%).

For South Europe, the indicator has an upward trend, with annual successive increases of 19.57% in 2013 and 15.98% in 2014. Under these conditions (actual levels of 6,500 kg in 2012, 7,772 kg in 2013 and 9,014 kg for 2014) decreases compared to the reporting basis occur only for the average of the period (7,762 kg and -13.89% respectively).

At the level of Western Europe, the oscillating trend of the indicator is found, the actual levels being 9,561 kg in 2012, 8,396 kg for 2013 (decrease by 12,18 compared to the comparison term - in dynamic), 10,235 kg in 2014 (+21.90%). As a result, an average of 9,397 kg (-8.18%) is reached.

If we analyze the EU-specific situation, we see an average of 7,014 kg (-13.55% in dynamic), averaged based on yearly sequential levels of: 6,072 kg in 2012, 6,856 kg for 2013 (+12,91%), 8,113 kg for 2014 (+18.33%).

Romania recorded an average level of 3,778 kg/ha (-21.08% in dynamics), with extreme levels of 2,187 kg/ha in 2012 and 4,788 kg/ha in 2014. The indicator dynamics are ascending (+105.49 and +6.54% in 2013 and 2014 against reporting bases).

Here is how to position the areas compared to the continental situation for the average yield of grain maize during the analyzed period (2012-2014). The year 2012 is characterized by the following situation: 181.66% Western Europe; 123.50% Southern Europe; 113.34% Northern Europe; 76.53% Eastern Europe.

In 2013, compared to the mainland situation, the regions are positioned as follows: 132.53% Western Europe; 122.68% Southern Europe; 106.76% Northern Europe; 87.64% Eastern Europe. For 2014, variable positioning of the continental zones is observed from 82.60% for Eastern Europe to 148.29% for Western Europe, while for the other two zones there are 93, 55 and 130.60% respectively North and South Europe respectively. The average of the analyzed period (6,167 kg) highlights variable positioning locations as follows: +52.39% Western Europe, +25.87% Southern Europe, +3.70% Northern Europe, -17.40% Europe East.

In the case of the European Union, there are positions on the continental situation as follows: 115.37% in 2012, 108.22% in 2013, 117.55% in 2014 and 113.74% in the average. Romania did not exceed the term of comparison in any year, registering only sub-unitary levels: 41.55% in 2012, 70.94% for 2014, 69.37% for 2014 and 61.26% for the average.

## CONCLUSIONS

The study led to the following conclusions:

- analyzing the global situation, it is noticed that Europe held 10.15% of the world area of 182,798,882 ha (the average of the period 2012-2014). The indicator has recorded a non-

uniform evolution at continental level, as is the case for Eastern Europe, Southern Europe and Western Europe. Unlike this trend, there are downward developments for the rest of the territorial units;

- analyzing the situation of total European production at the world level, there is a 11.73% share of the total world production of 977,174,180.67 t (average for the period 2012-2014). Evolution of the indicator has been increasing for all the analyzed areas, except for Northern Europe with a fluctuating evolution. The European Union provides 59.53% of the total continental production, up to about 7% over the cultivated area;

- in the global context, Europe has surpassed 15.44% of the world average production (5,342 kg/ha - the average of the period under review). The indicator is on an upward trend, except for the specific situation for North Europe (non-uniform train - as in the case of cultivated area and total production);

- Romania, appears as a great cultivator at European level (13.90% of the continental surface), but this positive aspect is not sustained by high performance levels (61.26% of the average continental production), which attracts by itself decreases relative to continental production (average share of only 8.50%);

- it would be ideal if Romania and Eastern Europe were to undergo a process of high recapitalization of agricultural production so that the existing potential would be greatly improved at the moment.

## REFERENCES

- [1] Matei, G., 2014, Crop production, Grains and legumes, Vol. 1, Publishing Sitech, Craiova, Chapter 2, p. 40 - 288
- [2] Nica, S., Glăman, Gh., Fântâneru A., 1995, Rural Economy - Compendium, Publishing Art Print, București, Chapter 12, p. 135 - 142
- [3] Pânzaru, R.L., Medelete, D.M., 2005, Agrarian economy - apps, Publishing Universitaria, Craiova, Chapter 2, p. 11-18
- [4] Pânzaru, R.L., Medelete, D.M., Ștefan, G., 2009, Vegetable production economy, Publishing Universitaria, Craiova, Chapter 1, p. 7 - 67
- [5] Roman, Gh. V. et al., 2011, Phytotechnics, Vol. I., Publisher Universitară, Bucharest, Chapter 2, p. 42 - 291

[6] Sin, Gh., 2005, Technological management of field crops, Publishing Ceres, București, p. 79 -97

[7] Ștefan, G., Bodescu, D., Toma, A. D., Pânzaru, R. L., 2007, Economy and food production chain, Publisher Alfa, Iasi, Chapter 3, p. 53 – 157

[8] Ștefan, M., 2011, Plant cultivation, Publisher Universitaria, Craiova, Chapter V, p. 73 – 110

[9] Zahiu, Lelțiția et al, 2010, Agriculture in the Romanian economy, Publishing Ceres,, Bucharest, Chapter III, p. 58-96

[10] <http://fao.org>