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THE EVOLUTION OF MAIZE PRODUCTION IN ROMANIA

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Abstract: *Agriculture is an important economic sector in all countries, being the main source of food for the population and a major supplier of raw materials for the manufacturing and export industries. Maize (*Zea mays L.*) is the most important crop in Romania as harvested area. Its expansion is due both to the particularities of food culture, food, and agrofitechnical peculiarities. In the current context, due to the significant quantities of maize it produces, Romania plays an important role in the maize market, being in full ascendancy in terms of production and export, reaching in 2017 the largest EU maize producer with a estimated production of 13 million tons. The main purpose of the paper is to highlight the evolution of the areas cultivated with corn and the production achieved in the post-Decembrist period, by presenting the data based on the processing and interpretation of the latest data and information published by the specialized institutions in Romania.*

Key words: *maize, production, surface, agriculture, tones.*

JEL Classification: *Q13, Q11*

INTRODUCTION

In Romania, agriculture continues to play an extremely important role, although it undergoes a vast restructuring process and a profound process of exploitation. Agriculture is one of the main branches in terms of material production. In the current context, both economic and social progress are in a relationship of interdependence regarding the stage of agricultural achievements.

The agricultural sector holds an important place in the Romanian economy, with an important contribution to the creation of gross domestic product (GDP) and also a key role in international trade. The importance of agriculture in the Romanian economy results from its weight in GDP, the labor force and the impact of the rural community. [4]

Romania has become conjectural self-sufficient, because we are surplus to only 5 of the 24 groups of agro-food products. We know a positive balance for cereals, oil seeds and oleaginous fruits, tobacco, live animals, products with raw material nature, and for the remaining agro-food groups we import massive, especially meat, sugars and sugar confectionery, fruits etc. The situation seems to be improving in recent years in terms of the total balance of trade balance, due to the major influence exert by cereals and oil seeds and oleaginous fruits trade. [2]

The main cereals exported by Romania are *wheat* and *maize*, with average annual weights of 45% for wheat and 41% for maize from the total cereal exports of the country (both in volume and in terms of value). [3,8]

Given that today's modern agriculture has to provide people with safe and nutritious food, food to ensure the protection of human health, there is a need to increase the quality and quantity of agricultural production. This can be done by reducing both the causes that lead to the reduction of grain crops and the improvement of agricultural techniques.

Agricultural crops are subject to several stressors: extreme weather conditions, pathogen attack and pests, lack of water, leading to lower production.

It is well known that Romania has a temperate continental climate, but the changes in the last decade of the year fragment this climate into one with nuances of excess. This is due to the high temperature variations between hot and cold, but also between daytime and nighttime temperatures. Besides these aspects, there are extremely large variations in both the total amount of precipitation

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from one year to the next and the distribution during the year, which led to high water related deficits and floods compromise large areas. [10]

In today's agriculture, production losses are largely due to unfavorable environmental factors.

In recent years, climate change in our country has experienced annual variations and seasons with high temperature amplitudes, precipitation and other meteorological factors, which have negatively influenced the level and production stability to field crops. [6]

Considering the wide spread of corn, both in Romania and other countries, its cultivation in the area where stress factors produce significant production losses, an important contribution is the creation and cultivation of resistant hybrids in order to reduce the damage. In this sense, the strategic and methodological improvements of the process of creation of inbred lines and of resistant maize hybrids can be considered of great interest in practice.

MATERIAL AND METHODS

Multi-annual average (A):

$$A = \frac{X_1 + X_2 + X_3 + \dots + X_n}{n}$$

Growth rate (%) [4]:

$$G(\%) = \frac{X_i \times 100}{A} - 100$$

G (%) - Growth rate;

X_i - The main indicator used in the analysis as a cultivated area, production, etc.;

A - Multi-annual average (A).

This paper is based on statistical data provided by FAOSTAT, the National Institute of Statistics and the Ministry of Agriculture and Rural Development.

Also, a number of books, magazines and specialized studies have been consulted to show as much as possible the evolution of cultivated area and maize production.

This evolution of maize production in Romania was made for the period 1990-2017, reflecting the evolution of the cultivated area, total production and average production per hectare.

RESULTS AND DISCUSSIONS

Romania plays an important role in European agriculture due to fertile soil and climate favorable to agriculture, animal husbandry and horticulture. It owns about one-third of the total agricultural land in the European Union, making it a leader in cultivated maize.

The modernization of agriculture and bringing it to a high degree of competitiveness was a desideratum declared since the interwar period, the agrarian economists of that period reluctantly seeking the re-occupation of the leading places from the pre-war period in terms of the cultivated area and the obtained productions, real "Breadbasket of Europe". Building a bridge in time over the communist period, we want followers of intergovernmental agrarian policies to open up to the international community in terms of competitiveness and not food dependence, aware of the often insurmountable difficulties that need to be overcome to bring our agriculture to the level of Western agriculture Europe. [9]

Table 1. The evolution of the areas cultivated with corn, the total production and the average production achieved in Romania, between 1990 and 2017

Specification	1990	1991	1992	1993	1994	1995	1996	1997	1998
Surface (thousand ha)	2466.7	2575.0	3335.9	3065.7	2983.4	3109.3	3277.0	3037.7	3128.9
Growth rate %	- 11.22	- 7.32	20.06	10.33	7.37	11.90	17.94	9.32	12.61
Total production (thousand tons)	6809.6	10497.3	6828.3	7987.5	9343.2	9923.1	9607.9	12686.7	8623.4
Growth rate %	- 27.72	11.43	- 27.52	- 15.21	- 0.82	5.33	1.99	34.67	- 8.46

Medium production (kg/ha)	2761	4077	2047	2605	3132	3191	2932	4176	2756
Growth rate %	- 19.62	18.69	- 40.41	- 24.16	- 8.82	- 7.10	- 14.64	21.57	- 19.77

Specification	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Surface (thousand ha)	3013.4	3049.4	2974.0	2894.5	3199.6	3274.1	2628.5	2520.1	2524.7	2441.5
Growth rate %	8.45	9.75	7.03	4.17	15.15	17.84	- 5.40	- 9.30	- 9.13	- 12.13
Total production (thousand tons)	10934.8	4897.6	9119.2	9399.8	9577.0	14541.6	10388.5	8984.7	3853.9	7849.1
Growth rate %	16.07	- 48.01	- 3.20	- 0.22	1.66	54.36	10.27	- 4.63	- 59.09	- 16.68
Medium production (kg/ha)	3629	1606	3066	3247	2993	4441	3952	3565	1526	3215
Growth rate %	5.65	- 53.25	-10.74	- 5.47	-12.87	29.29	15.05	3.78	- 55.57	- 6.40

Specification	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 1990-2017 Growth rate (%)
Surface (thousand ha)	2338.8	2098.4	2589.7	2730.2	2518.3	2512.8	2528.0	2581.0	2402.0	2778.52
Growth rate %	- 15.82	- 24.48	- 6.79	- 1.74	9.36	- 9.56	- 9.02	- 7.11	- 13.55	100
Total production (thousand tons)	7973.3	9042.0	11717.6	5953.4	11305.1	11988.6	8871.0	10746.4	14326	9420.59
Growth rate %	-15.36	- 4.02	24.38	- 36.80	20.00	27.26	- 5.83	14.07	52.07	100
Medium production (kg/ha)	3409	4309	4525	2181	4489	4771	3450	4164	5964	3434.96
Growth rate %	- 0.75	25.44	31.73	- 36.50	30.68	38.89	0.44	21.22	73.63	100

Source: The data in the table was taken from the website of the Ministry of Agriculture and Rural Development and of the National Institute of Statistics; Own calculations

In the analyzed period, the highest production of maize was 14541.6 thousand tons in 2004, and the lowest was achieved in 2007, namely 3853.9 thousand tons, resulting in an increase of 54,36% more than the multiannual average (9420.59 thousand tons).

As regards the area cultivated with maize, the largest area was 3335.9 thousand ha in 1992 and the smallest in 2010, respectively 2098.4 thousand ha, resulting in an increase of 20.06% more than the multiannual average (2778.52 thousand ha).

The evolution of total maize production between 1990 and 2007 varied between 3854 thousand tons in 2007 and 14542 thousand tons in 2004 and the highest average production was 4441 kg in 2004.

In the last 10 years, corn production has fluctuated from 7.9 million tons in 2008 to a minimum harvest of 6 million tons in 2012, then to a peak of 12 million tons in 2014. In 2015, production was 8.9 million tons, down 26% compared to 2014. This dramatic decrease of our country's corn crop was determined by the decrease in yield (3.6 tons / ha) due to the extreme drought in the spring and summer of 2015, with 2.5 million hectares (MADR, 2016) maintaining the sown area in the last 3 years.

According to EUROSTAT, the corn-covered area in Romania decreased by 1.5% in the 2016/2017 season as a result of higher exposure of farmers to other cereal-oleaginous plant products. The slight reduction of areas in the current season did not structurally alter the crop level at economy level. Maize remains the most cultivated product of Romanian agriculture with a share of 38.7% of the total areas covered with cereals, seeds and grains oleaginous.

According to EUROSTAT, COCERAL-SEPTEMBER 2016, Romania is traditionally the leader of the European Union according to the areas cultivated with corn. Season 2016/2017 is no exception to this rule, so that the areas covered by maize on site are at least 1 million hectares higher than those of any other direct competitor on the Community market. Maize cultivated in Romania covers 28.2% of the total area cultivated with this product by the 28 EU economies in the current season.

According to EUROSTAT, COCERAL-SEPTEMBER 2016, Romania is traditionally the leader of the European Union according to the areas cultivated with maize. Season 2016/2017 is no exception to this rule, so that the areas covered locally by maize are at least 1 million hectares higher than those of any other direct competitor on the Community market. Maize cultivated in Romania covers 28.2% of the total area cultivated with this product by the 28 EU economies in the current season.

In 2017, maize production was 14326 thousand tons, which placed Romania among the top producers in the European Union, this being done on a fund already known by Romania, since it has occupied in the last years the first position on the surface cultivated with corn and second, after France, to the production.

Romania's domestic maize grains requirement amounts to 4.5 million tons, which offers significant export opportunities, and this is also one of the products in Romania's top trade in agri-food products, after wheat. Only in the first eight months of 2017 was exported to the intra and extra-Community countries a quantity of 1.426 million tons of maize for which 338.2 million euro. [7]

CONCLUSIONS

During the analyzed period, although the area cultivated with maize has been steadily decreasing, from 3335.9 thousand hectares in 1992 to 2098.4 thousand ha in 2010, maize production has registered an essential increase ranging between 3853.9 and 14541, 6 thousand tons, on the basis of the analysis carried out, that there was an increase of 52.07%, more than the multiannual average of 9420.59 thousand tons. Average maize yield per hectare ranged from 1526 to 5964 kg / ha, with an increase of 73.63% over the multiannual average (3434.96 kg / ha).

Climate change mitigation methods, as well as measures to improve agricultural technologies, should start with the use of high biological value seeds and crops that can cope with abiotic and biotic stress factors.

In Romania maize production could increase much more if the areas cultivated with certified corn seed would intensify, as still uncertified corn seed is still used in Romania (salvaged seed). In the period 2012-2015, the areas cultivated with uncertified seed have steadily decreased, the areas in which more land is still cultivated with "seed from the ground" being Moldova, Southeast, West and the center of the country. In the south-eastern part of the country it was found that only small areas are cultivated with salvaged seed. At this time in Romania the area cultivated with maize seed is estimated to be 30%. [5]

Taking into account the current analysis and the current context, Romania will continue to become a key pawn in the European Union in the coming years, given the significant quantities it produces, being in full ascendancy in terms of production and export.

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