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COMPARATIVE ANALYSIS OF TECHNICAL INDICATORS FOR CONVENTIONAL AND ECOLOGICAL AGRICULTURE

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Abstract: *Conventional agriculture is characterized by intensive mechanization and chemization, making products competitive on the market of agricultural products, while organic farming is a "modern" process of growing plants, fattening animals and producing food, which stands out. fundamental of conventional agriculture. In this paper, the technical indicators for the two types of conventional and ecological agricultural systems will be analyzed. The analysis of the surfaces, the average productions as well as the total ones from the quantitative point of view will be carried out, with the help of the data provided by the National Institute of Statistics (INSSE) and the Institute of Research - Ecological Agriculture (FIBL). This analysis highlights the evolution or involution, retrospective and current situation for the two types of agricultural systems at national level, using the method of comparative analysis, in order to determine the direction of these agricultural systems.*

Keywords: *evolution, conventional, ecological*

JEL Classification: *Q 14, Q57*

INTRODUCTION

Agriculture is the basic branch of the national economy through which food products and raw materials are provided for the consumer goods industry, it is a branch of material production, where, with the help of green plants and under human influence, the kinetic energy of to the sun, in potential energy organic matter, the only form of energy accessible to the human and animal organism. As an independent occupation, agriculture has required the emergence of agricultural producers who, in addition to the process of obtaining the products, also deal with the transformation of plant agricultural products into animal or industrial products, which are then used in human nutrition.

Agriculture facilitates the creation and development of new branches of production. Conventional agriculture is characterized by intensive mechanization and chemization, making competitive products on the agricultural products market; this system of agriculture is based in particular on the concentration and specialization of production.

Organic farming (term similar to organic or organic farming) is a "modern" process of growing plants, fattening animals and producing food, which is fundamentally different from conventional farming. Organic farming contributes to the growth of economic activities with an important added value and has a major contribution to increasing the interest for the rural area.

MATERIALS AND METHODS

The present work is subject to the analysis of the land fund, the surfaces, the average and total productions for agricultural crops, but also total productions for crops in ecological system at national level, so this is the main objective of the work, to show the positive or negative evolution with data provided by the National Institute of Statistics (INS) and the Ministry of Agriculture and Rural Development (MADR), Research Institute of Organic Agriculture (FIBL) using the method of quantitative and qualitative comparative analysis of data for the period analyzed 2013-2017.

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RESULTS AND DISCUSSION

The territory of Romania totals an area of 23.8 million hectares, where the agricultural area used in the agricultural units was about 14.5 million hectares, representing 61.37% of which about 9.2 million hectares represent arable land at the end of 2014.

Table 1.1 Land fund, according to the mode of use

Use categories of the land fund	2009	2010	2011	2012	2013	2014	2014/2009	2014/2013
Total	23839071	23839071	23839071	23839071	23839071	23839071	0	0
Agricola	14684963	14634436	14621427	14615057	14611883	14630072	-0,374	0,124
Arable	9422529	9404008	9379489	9392262	9389254	9395303	-0,289	0,064
Pastures	3313785	3288725	3279251	3270610	3273961	3272165	-1,256	-0,055
Rough	1528046	1529561	1554680	1544957	1541854	1556246	1,845	0,933
Live nurseries	215382	213571	211347	210475	210270	209417	-2,769	-0,406
Orchards and nurseries	205221	198571	196660	196753	196544	196941	-4,035	0,202
Non-agricultural land	9154108	9204635	9217644	9224014	9227188	9208999	0,600	-0,197
Forests and other vegetation	6752998	6758097	6759140	6746906	6742056	6734003	-0,281	-0,119
Busy with water	833226	833949	822202	836856	835997	831495	-0,208	-0,539

Source: National Institute of Statistics

Reporting on 2014, in 2009 (base year) we see that the agricultural area decreased by 0.37% while in the same year compared to the previous year it increased by 0.12%. Regarding the arable area, it can also be observed changes, decreasing in 2014 compared to the base year by about 0.29% but increasing in the same year compared to the previous year by 0.064%.

Agriculture can be evaluated in terms of surface area, average and total production so we can see that the arable area at national level is mainly occupied by cereal, oil and vegetable crops so that for the period 2013-2017 the areas occupied by these crops have varied. For a wider and varied perspective, cereal, oilseed crops and vegetables were taken into consideration.

Table 1.2 Surfaces with the main agricultural crops

The main cultures	2013	2014	2015	2016	2017	2017/2013	2017/2016
	<i>ha</i>					<i>%</i>	
Wheat - total	2103985	2112866	2106591	2137731	2052917	-2.43	-3.97
Barley is barley	495685	515996	469859	481605	455457	-8.12	-5.43
Corn beans	2518268	2512809	2605165	2580975	2402082	-4.61	-6.93
Pea grains	31765	27364	31702	43218	106562	235.47	146.57
Sunflower	1074583	1001020	1011527	1039823	998415	-7.09	-3.98
Rape	276596	406705	367885	455953	597967	116.19	31.15
Soy beans	67672	79910	128156	127266	165143	144.03	29.76

Source: National Institute of Statistics

From the above table, respectively table 1.2, it is observed that the areas cultivated with wheat in 2017 decreased by 2.43% compared to 2013 and by 3.97% compared to 2016.

The most significant decrease of the surface is registered in 2017 compared to 2013 in barley and barley culture, which shows a decrease of 8.12%.

At the opposite pole with the highest growth of the surface is recorded the pea crop, the area cultivated with this plant increasing by 235.47% in 2017 compared to the base year and by 14.57% compared to the previous year. There are also positive developments for the areas where rape and soybeans were grown.

Table 1.3 Average productions for the main agricultural crops

The main cultures	2013	2014	2015	2016	2017	2017/2013	2017/2016
	<i>Kg/ha</i>					<i>%</i>	
Wheat - total	3468	3590	3780	3944	4888	40.95	23.94
Barley is barley	3111	3319	3461	3773	4186	34.55	10.95
Corn beans	4488	4770	3462	4159	5959	32.78	43.28
Pea grains	1719	1864	1744	1823	2649	54.10	45.31
Sunflower	1993	2187	1765	1955	2917	46.36	49.21
Rape	2408	2604	2499	2835	2798	16.20	-1.31
Soy beans	2216	2539	2045	2070	2383	7.54	15.12

Source: National Institute of Statistics

Analyzing the year 2017, at the base year 2013 we can see that the yield obtained per hectare increased for all crops, the highest growth being registered at the pea crop of 54.1%, at the opposite pole with the smallest growth being soybean culture with 7.54%.

Significant increases are observed in the same year, 2017, but compared to the previous year where the crops of corn, peas and flower are in the leading positions in terms of changes with the production obtained per hectare. The highest yield per hectare is recorded in the corn crop, while at the opposite pole is the pea crop.

Table 1.4 Total productions for the main agricultural crops

The main cultures	2013	2014	2015	2016	2017	2017/2013	2017/2016
	<i>tons</i>	<i>%</i>					
Wheat - total	7296373	7584814	7962421	8431131	10034955	37.53	19.02
Barley is barley	1542247	1712509	1626330	1817269	1906703	23.63	4.92
Corn beans	11305095	11988553	9021403	10746387	14326097	26.72	33.31
Pea grains	54590	51017	55302	78808	282245	417.03	258.14
Sunflower	2142087	2189309	1785771	2032340	2912743	35.98	43.32
Rape	666097	1059121	919473	1292779	1673327	151.21	29.44
Soy beans	149931	202892	262061	263380	393495	162.45	49.40

Source: National Institute of Statistics

It is worth noting that the total yields obtained for the seven crops increased significantly in 2017 compared to 2013 respectively 2016 although, according to the data presented previously, the areas covered by these crops decreased for the reference period. These increases in production can be accounted for by the average yields obtained per hectare using the technologies applied, on favorable weather conditions during this period but also on the quality or variety of the seed used. The grain production for grains increased in 2017 compared to the previous year, as follows: maize grain - 33.3%, barley and barley 4.92%, wheat 19.2%.

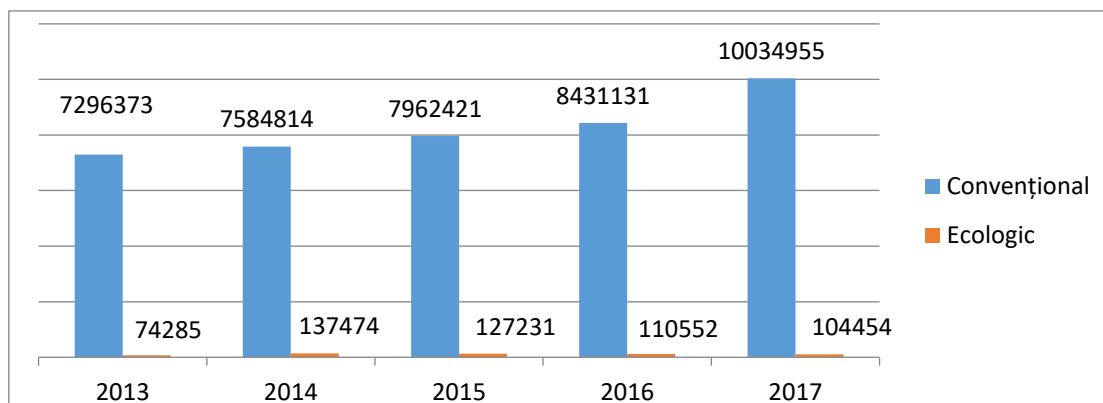
Table 1.5 Total productions for the main agricultural crops in ecological system, national level

The main cultures	2013	2014	2015	2016	2017	2017/2013	2017/2016
	<i>tons</i>					<i>%</i>	
Wheat - total	74285	137474	127231	110552	104454	40.6	-5.5
Pea grains	-	35715	39985	40055	52093	45.9	30.1
Sunflower	-	38731	37262	36290	47707	23.2	31.5
Rape	-	28031	20401	20772	24667	-12.0	18.8
Soy beans	-	17164	22036	19376	18924	10.3	-2.3

Source: National Institute of Statistics

From the table above, respectively (tab.1.5), we observe that wheat production increased by 40.6% in 2017 compared to 2013. The highest growth recorded in 2017 compared to 2013 is registered in the its peas production increased by 45.9%. At the opposite pole with the smallest increase of the total production is registered the soybean crop, the total production increasing by only 10.3%.

Graph 1. Production of wheat in conventional and organic system between 2013-2017



From the graph above (graph no. 1) it can be observed that the wheat production encountered in the two analyzed systems are very quantitatively different, but the quality of the organic products is higher compared to the quality of the products found in the conventional agricultural system.

CONCLUSIONS

Organic farming, relatively new in European law, is practiced in 2018 in the EU member states and beyond, being practiced in approximately 170 countries. According to the statistical data provided by the German Institute of Organic Agriculture Research in 2017, organic farming was practiced on an area of approximately 12 million hectares, 78.7% more than in 2007. In Romania, on 28/05/2019, there are 13 inspection and certification bodies validated by OFIS (Organic Farming Information System).

The inspection and certification bodies in the territory of Romania issued in 2014, about 12 thousand certificates for organic farming, of which about 3 thousand were released in the plant sector, at a difference of three years, respectively 2017 (according to the website of FiBL), a number of 7,908 organic producers in the plant system have been identified and their number is expected to increase.

Organic farming is gaining increasing importance and is constantly expanding. This development is supported by the growing consumer demands for organic agricultural products, which are becoming more aware and interested in ensuring health through the consumption of products, to which are added the society's demands for sustainable agricultural development, as well as the multitude of favorable effects at the level of agricultural farm and environment.

Conventional as well as organic agriculture is a sector of great prospects for Romania, our country benefiting from appropriate conditions for the development of the two agricultural systems, such as fertile soil and the reduced level of pollution of the natural space, in comparison with economically developed countries, in which super intensive agricultural technologies, largely based on chemical fertilizers and synthetic pesticides, are widely used.

The knowledge of the two aspects can support the agricultural producer, the technical-economic support provided can provide the necessary information in evaluating the activity undertaken and taking a technical or economic decision in order to increase the profitability in conventional and / or organic farms.

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