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COMPETITIVE AGRICULTURAL SYSTEMS: CONVENTIONAL AGRICULTURE VERSUS ECOLOGICAL AGRICULTURE

ABSTRACT

Developing production systems that integrate the benefits of the conventional agricultural system and the benefits of the organic farming system are needed to create a more sustainable future for agriculture. The organic farming system is perceived as a system that provides solutions to the problems faced by the agricultural sector: increasing sustainability, biodiversity, improving soil and air quality, etc. Romania has responded to these benefits by encouraging farmers to adopt environmentally friendly farming practices, financial incentives (in addition to direct payment schemes, payments under Measure 11 – Organic Farming). The paper presents some estimates of the evolution of incomes, costs and profitability of agricultural products for the period 2015–2018 under conventional and organic farming conditions. From the results it is deduced that farmers who have gone into organic farming can earn incomes equal to their conventional or even higher. The studies made in this paper contribute to a deeper knowledge of the two systems of agriculture in general and to the economic knowledge of conventional farming versus the economy of organic farming in particular. Although in recent years the interest in organic farming has increased, it can be noticed that there is a small amount of accessible information on yields, costs and profit.

Key words: conventional agricultural economy, organic farming economy, incomes, expenditures, profitability.

JEL Classification: O12, P50, Q18, Q57.

1. INTRODUCTION

Organic farming systems have attracted a lot of attention over the last decade because they are perceived as providing solutions to the problems that the agricultural sector is currently facing. Organic farming has the potential to offer benefits in terms of environmental protection, conservation of non-renewable resources and improvement of food quality (Worthington, 2001, Haas et al., 2005, quoted by Dwivedi and Charyulu, 2010).

EU countries have recognized and responded to these potential benefits by encouraging farmers to adopt green farming practices, either directly through financial incentives or indirectly by supporting research, extension and marketing

initiatives. There is, however, a reluctance on the part of farmers to continue the conversion to the organic system, due to high perceived costs and risks. This can be seen in the tendency to reduce the areas cultivated under organic system (Database EUROSTAT).

Farmers who have gone into organic farming can earn incomes equal to those of their conventional counterparts through the existence of premium markets for their products (Mac Donald, 2004, quoted by Dwivedi and Charyulu, 2010).

Romania has initiated programs such as the National Rural Development Program for the conversion to organic farming and the maintenance of organic farming practices through Measure 11 – Organic Farming. Despite the focus on organic farming in recent years, there is very little information available on the costs and yields of organic farming in Romania. Similarly, there are only a few attempts to compare the economy of organic and conventional production systems in different countries. Therefore, this paper focuses mainly on the economics of organic farming versus conventional agriculture.

2. STATE OF KNOWLEDGE

Conventional Agriculture or Organic Farming? Are they competitive production systems? Questions to which the research continues to look for answers. Studies show that one of the most important problems faced by organic farms is the yield gap compared to conventional farming. Organic farms require more land to compensate for these gaps, by about 25–110% (genetic literacy project, 2017). While organic farms tend to use less energy (by 15% less), greenhouse gas emissions are 4% lower. Energy use is lower in organic systems due to the low dependence on synthetic fertilizers and on energy-consuming pesticides. GHG emissions are similar in organic and conventional systems due to the compromise between the application of synthetic fertilizers in conventional systems and the use of manure in organic systems (genetic literacy project, 2017).

Among certain critics and skeptics, there is a frequent opinion that organic farming is more environmentally friendly. They claim that organic farmers better deal with their soil by avoiding many pesticides and herbicides used by conventional farmers. This argument has caused dozens of studies in recent years that have examined many factors such as yields and land use, use of pesticides and energy.

A review of several scientific papers suggests that conventional farming has a clear advantage over organic farming in several key areas, particularly with regard to the area of land needed to produce the same volume of production. There are, however, some things that conventional agriculture can learn from organic systems, according to the authors (genetic literacy project, 2017). Combining the advantages of different production systems, such as low dependence on chemical

inputs, with the high yields of conventional systems, could lead to a more sustainable agricultural system.

The research on the two types of farming systems, i.e. conventional and organic, focuses both on the environmental benefits (increasing sustainability, biodiversity, improving soil and air quality, etc.) and on the economic benefits linked to the growth of economic activities with an important value added, which can be found in organic products (Grigore A. A. et al., 2008).

The studies that investigated the profitability of the two production systems show that the economic efficiency is slightly higher in the organic system than in conventional systems. (Andrei J. V. et al., 2012). Other studies on the economic efficiency of both production systems demonstrate that organic systems are more efficient than conventional ones. In this case, the main conclusion of the research was that *even with a lower yield, organic crops obtain a higher rate of return and therefore better efficiency than those obtained in conventional agriculture*, (Bălan & Toma E., 2012).

The present study analyzes from the point of view of the economic effect the profitability of crops cultivated in the organic system compared to those cultivated in the conventional farming system.

3. MATERIAL AND METHOD

Research on conventional and organic farming systems is based on production costs and estimates of selling prices for wheat, maize, rapeseed, soybean, and sugar beet for the production years 2016, 2017 and 2018. The results were obtained in the ADER 13.1.2 research project. In order to highlight the differences between the two production systems, the following indicators were calculated:

✓ *The economic value of the production* was calculated by multiplying production in physical terms by the estimated prices, being expressed in RON and in euros. The conversion into euros was achieved by using the official exchange rates of the European Central Bank valid for the respective years.

Direct Payments: since 2007, APIA has coordinated and allocated EU funds to farmers coming from the European Agricultural Guarantee Fund (EAGF); for the organic farming, they have been allocated through the European Agricultural Fund for Rural Development (EAFRD).

→ 2015/2016: SAPS (79.7392 euro/ha) + Redistributive payment (5 euro/ha) + Green fee payment (59.1277 euro/ha) + NTA 1 (19.1942 euro/ha) = 163.061 euro/ha (720.3387 RON/ha);

→ 2016/2017: SAPS (96.8861 euro/ha) + Redistributive payment (5 euro/ha) + Green fee payment (57.3714 euro/ha) + NTA 1 (17.7203 euro/ha) = 176.978 euro/ha (788.206 RON/ha);

→ 2017/2018: SAPS (97.2452 euro/ha) + Redistributive payment (5 euro/ha) + Green fee payment (57.1745 euro/ha) + NTA 1 (16.0078 euro/ha) = 175.4275 euro/ha (806.844 RON/ha).

Coupled support (SC) granted in the period 2016–2018 for soybean: 269 euro/ha; 232.35 euro/ha and 191.9 euro/ha; for sugar beet: 786 euro/ha, 877.49 euro/ha and 1,012.3 euro/ha.

The national transitional aid (NTA 6) for sugar beet: 99.71 euro/ha in 2016; 90.51 euro/ha in 2017 and 72.69 euro/ha in 2018.

✓ *Production costs* – the total value of the resources used by the agricultural holding in a given period of time (usually one year) to obtain various agricultural products and deliver them on the market.

✓ *Taxable income* – calculated by subtracting the main production value of intermediate consumption for the main production.

✓ *Net income* – calculated by deducting from taxable income the related tax value.

✓ *Net income + subsidies* – calculated by summing up the subsidies granted by the state budget to the net income.

✓ *Taxable income rate* – expressed as a percentage and calculated by reporting taxable income to intermediate consumption for the main production.

✓ *Net income rate + subsidies* – expressed as a percentage and calculated by dividing net income + intermediate consumption subsidies for the main production.

4. RESULTS AND DISCUSSIONS

An overview of the number of operators and areas under the organic farming system. The development of organic farming places Romania among the countries with agricultural areas under organic farming system. There are more than 10 thousand operators with over 156 thousand ha in total (3% of the EU area). Out of this area, the arable land converted to organic farming represents more than 98 thousand ha (2.9%), while the area in conversion to organic farming totals over 58 thousand ha (1.1%), placing Romania on the 10th position in terms of fully converted area and on the 8th position in terms of areas under conversion (EUROSTAT, 2018), but the trend is declining. If we refer to field crops, which are the subject of the present study, i.e. wheat, maize, rapeseed, soybean, these are cultivated on significant areas from the areas fully converted to organic farming (Fig. 1).

Organic or conventional farming? In 2014, a European Commission (EC) study analyzed which of the two types of agriculture, i.e. organic or conventional, is more profitable for the European Union (EU) farmers. Several economic aspects were taken into consideration in the study, ranging from production costs and farm yields to selling prices and subsidies. Although the study has certain limits, a few conclusions are quite interesting. Thus, *in the investigated countries, organic farming*

brings a comparable income or, in some cases, even higher incomes than conventional agriculture, but this is largely due to the fact that subsidies for “eco” agriculture are higher than those for conventional agriculture. (Agro-monitor/Agricultural news, 2014).

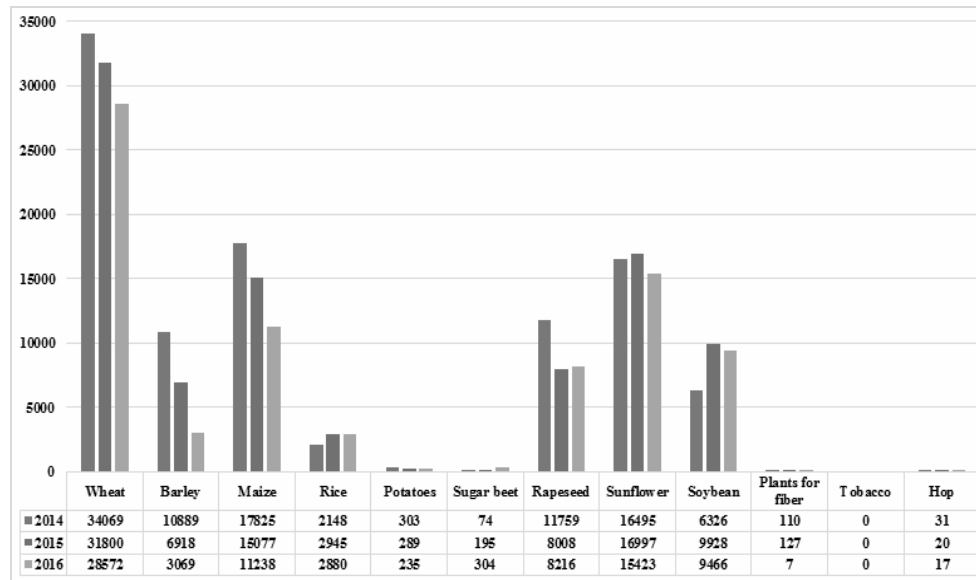


Figure 1. Arable land: fully converted to organic farming (2014–2015).

Competitive farming systems: conventional agriculture or organic farming? Which has a better economic performance? The analysis focuses on issues related to the economic differences between organic and conventional farming as well as on the possibilities to make legitimate claims about the relevance of these differences. Through a systematic analysis of the calculated indicators, we examined the values of indicators and how they reflect the differences between the two types of agriculture. This analysis mainly focuses on the results in which there were either specific differences, or comparisons between the values resulting from the economic calculation of the two production systems, or on statements about the contribution of each crop and farming type to economic benefits.

The economic analysis of organic **wheat** production in value terms, compared to conventional wheat (column 6 versus column 4) shows decreasing fluctuations (16.7% and 20%) due to yield differences. (Table 1, column 8, line 1). The assessment of economic efficiency calculated on the basis of the production value indicators is not dependent only on the variation of this factor but also on a certain variation in production costs. The yield differences are covered by better selling prices for organic wheat. Subsidies are 127% higher in organic wheat than in conventional wheat (Table 1 – column 8, line 2).

Table 1

Wheat

Indicators	Year of production-harvest	Euro value	Wheat Conventional		Wheat Organic		Variations Organic/Conventional	
			6000 kg/ha		4000 kg/ha		Absolute values (col. 6-4)	100 - (col. 8/col. 4) * 100 (± %)
			lei	euro	lei	euro	lei	%
1	2	3	4	5	6	7	8	9
Production value	2015/2016	4.4176	3990	903	3324	752	-666	-16,7%
	2016/2017	4.4537	4380	983	3504	787	-876	-20,0%
	2017/2018	4.5993	4572	994	3808	828	-764	-16,7%
Subsidies	2015/2016	4.4176	720	163	1683	381	+963	+133,7%
	2016/2017	4.4537	788	177	1759	395	+971	+123,2%
	2017/2018	4.5993	807	175	1809	393	+1002	+124,3%
Total expenditures	2015/2016	4.4176	4506	1020	4289	971	-217	-4,8%
	2016/2017	4.4537	4973	1117	4636	1041	-337	-6,8%
	2017/2018	4.5993	5256	1143	4993	1086	-263	-5,0%
Taxable income*	2015/2016	4.4176	-516	-117	-965	-219	-449	-87,0%
	2016/2017	4.4537	-593	-133	-1132	-254	-539	-90,8%
	2017/2018	4.5993	-684	-149	-1185	-258	-501	-73,2%
Net income + subsidies	2015/2016	4.4176	287	65	872	197	+585	+204,3%
	2016/2017	4.4537	290	65	808	181	+518	+178,8%
	2017/2018	4.5993	191	41	743	161	+552	+289,2%
Net income rate + subsidies	2015/2016	%	6.4		20.3		+ 13.9 p.p	
	2016/2017	%	5.8		17.4		+ 11.6 p.p	
	2017/2018	%	3.6		14.9		+ 11.3 p.p	

Source: ADER Project 13.1.2, own calculations.

* Income tax is deducted from taxable income (16% in the production year 2016 and 10% since 2017); p.p. – percentage points.

For the three years of production, total expenditure is lower for organic wheat compared to conventional wheat by 4.8%, 6.8% and 5% respectively, which means that the value of raw material inputs shows an opposite situation, namely (16.7%, 20% and 16.7%), (column 6 versus column 4, lines 1 and 3). The unequal rhythm of such differentiation, which has multiple and important meanings, bears an influence on the correlation between the economic value of production and the economic value of production costs. From the analysis of the static ratio (production value/production costs), it results that no economic efficiency growth correlation was achieved between the rate of intermediate consumption expenditure and the rate of production value, the less than one ratio for conventional wheat (0.89, 0.88 and 0.87) being better than the less than one ratio for organic wheat (0.78, 0.76 and 0.76).

The taxable income obtained from the organic wheat crop (column 8, line 4), in the year 2018 (-501 RON, 73.2%) is slightly higher than in 2017 (-539 RON, 90.9%) and down compared to 2016 (-449 RON, 87%). Comparing the taxable income obtained in 2018 to that obtained in 2016 in the conventional wheat crop,

we can see a decrease by 32.6% in the conditions in which revenues increased by 14.6% (positive) and the operating costs by 16.6% (negative aspect). The same situation of decreasing taxable income, by 22.8%, in 2018 compared to that obtained in 2016, is also found in the wheat crop cultivated under organic system, as the economic value of production increased by 14.6% (positive aspect) and operating costs increased by 16.4%. Taxable income for organic wheat is much lower than for conventional wheat (–449 RON (87%), –539 RON (90.9%) and –501 RON (73.2%) (columns 8 and 9, line 4). The situation changes in the case of the indicator net income + subsidies. Thus, the organic wheat is twice as profitable than the conventional wheat (by 585 RON in 2016 (203.8%), by 518 RON in 2017 (+178.6%) and by 552 RON in 2018 (+289%) (columns 8 and 9, line 5). The rate of return on organic wheat is on the average by 12.6% higher than in the case of wheat grown under conventional system. In 2018 as compared to the year 2016, the rate of profitability fell by 2.7 p.p. in conventional wheat and by 5.5 p.p. in organic wheat.

Conclusion: From the comparative analysis of the organic wheat crop versus the conventional wheat crop, it results that there are significant differences in terms of obtained economic results. In this respect, the results are visible: there is a decrease in production value at a higher rate than operating costs in organic wheat. The profitability of the production activity was ensured by the subsidies received.

The economic value of organic **maize** production (column 6 vs. column 4) is by 16.6% lower on the average than that of conventional maize due to yield differences (Table 2 – columns 8 and 9, line 1). Subsidies are on the average 127% higher for organic maize than for conventional maize (Table 2 – column 9, line 2). For the three years of production, total expenditure is lower for organic maize compared to conventional maize by 8.6%, 5.8% and 3.1%.

These differences point out that there is generally no direct proportionality link between the economic value of production and production costs, due to the specificity of agriculture and the natural factors whose frequency and intensity have a probabilistic character. It is estimated that the ratio of incomes/expenditures for conventional maize (0.99 and 0.96) is less than one for the years 2017 and 2018, the situation being similar for organic maize (0.94, 0.87 and 0.83). In this case, there was no correlation between the effort made and the economic effect obtained.

The taxable income obtained in organic maize crops (columns 8 and 9, line 4) in the year 2018 is about 3.4 times lower than that obtained in conventional maize (–655 lei); in 2017 the taxable income for organic maize is lower by 518 RON (about 9 times compared to conventional maize), while in 2016 the taxable income is 2.8 times lower than in conventional maize (columns 8 and 9, line 4).

The situation changes for the net income + subsidy indicator value. Thus, organic maize is more profitable than conventional maize (by 634 RON in 2016

(+75.7%), 536 RON in 2017 (+72.3%) and 413 RON in 2018 (+65%) (columns 8 and 9, line 5).

From the horizontal analysis of data, the profitability rates for organic maize are higher than for conventional maize, by 16.8% in 2016, by 12.6% in 2017 and by 8.8% in 2018; the vertical analysis of data points to a decrease in profitability rates in 2018 compared to 2016 by 5.8% in conventional maize and 13.8% in organic maize. It is estimated that in the investigated period 2016–2018, the profitability of the maize crop cultivated in organic and conventional systems tends to decrease.

Table 2

Maize

Indicators	Year of production-harvest	Euro value	Maize Conventional		Maize Organic		Variations Organic/Conventional	
			7500 kg/ha		5000 kg/ha		Absolute values (col. 6–4)	100 – (col. 8/col. 4) * 100 (± %)
			lei	euro	lei	euro	lei	%
1	2	3	4	5	6	7	8	9
Production value	2016	4.4176	4725	1070	3940	892	-785	-16.6%
	2017	4.4537	4800	1078	4000	898	-800	-16.7%
	2018	4.5993	4875	1060	4065	884	-810	-16.6%
Subsidies	2016	4.4176	720	163	1683	381	+963	+133.7%
	2017	4.4537	788	177	1759	395	+971	+123.2%
	2018	4.5993	807	175	1809	393	+1002	+124.3%
Total expenditures	2016	4.4176	4585	1038	4192	949	-393	-8.6%
	2017	4.4537	4856	1090	4574	1027	-282	-5.8%
	2018	4.5993	5066	1102	4911	1068	-155	-3.1%
Taxable income*	2016	4.4176	140	32	-252	-57	-392	-280.0%
	2017	4.4537	-56	-13	-574	-129	-518	-928.3%
	2018	4.5993	-191	-42	-846	-184	-655	-342.1%
Net income + subsidies	2016	4.4176	838	190	1472	333	+634	+75.7%
	2017	4.4537	741	166	1277	287	+536	+72.3%
	2018	4.5993	635	138	1048	228	+413	+65.0%
Net income rate + subsidies	2016	%	18.3		35.1			+16.8 p.p
	2017	%	15.3		27.9			+12.7 p.p
	2018	%	12.5		21.3			+16.8 p.p

Source: ADER Project 13.1.2, own calculations; * idem.

Conclusion: The profitability of the organic and conventional maize crop was given by the subsidies received, the difference of 12.7% (2016–2018 average) between the two production systems being to the advantage of organic maize.

The economic value of organic rapeseed production in the three years (column 6 versus column 4) is on the average by 187 RON (3.7%) lower than that of the rapeseed crop cultivated in conventional system (Table 3 – columns 8 and 9, line 1). Subsidies are on the average by 127% higher in organic rapeseed compared to conventional

rapeseed (Table 3 – column 9, line 2). For the three years of production, total expenditure is lower for organic rapeseed than for conventional rapeseed, by 451 RON (9.7%) on the average. The analysis of the incomes/expenditures ratio shows that between the rate of intermediate consumption expenditure and the rate of the economic value of production, the correlation between the effort made and the economic effect obtained was respected. It is estimated that the ratio of incomes/expenditures for organic rapeseed is greater than one (1:1.15 in the years 2016 and 2017, 1:1.14 in 2018 respectively), a situation similar to conventional rapeseed (1:1.09 (2016), 1:1.07 (2017), and 1:1.09 (2018)).

The taxable income obtained from the organic rapeseed crop compared to conventional rapeseed crop (columns 8 and 9, line 4) represents 264 RON on the average (70%) (columns 8 and 9, line 4). From the vertical analysis of taxable income, there is a tendency for income growth in both rapeseed farming systems, as well as a doubling of income for organic rapeseed. The values of the net income + subsidy indicator follow an increasing trend. Thus, organic rapeseed compared to conventional rapeseed is more profitable (+1139 RON in 2016 (+ 108.3%), + 1198 RON in 2017 (+ 111.5%) and + 1264 RON in 2018 +1.4%) (columns 8 and 9, line 5).

Table 3

Rapeseed

Indicators	Year of production - harvest	Euro value	Rapeseed Conventional		Rapeseed Organic		Variations Organic/Conventional	
			3500 kg/ha		3000 kg/ha		Absolute values (col. 6–4)	100 – (col. 8/col. 4) * 100 (± %)
			lei	euro	lei	euro	lei	%
1	2	3	4	5	6	7	8	9
Production value	2015/2016	4.4176	5020	1136	4740	1073	-280	-5.6
	2016/2017	4.4537	5020	1127	4800	1078	-220	-4.4
	2017/2018	4.5993	5125	1114	5064	1101	-61	-1.2
Subsidies	2015/2016	4.4176	720	163	1683	381	+963	+133.7
	2016/2017	4.4537	788	177	1759	395	+971	+123.2
	2017/2018	4.5993	807	175	1809	393	+1002	+124.3
Total expenditures	2015/2016	4.4176	4626	1047	4135	936	-491	-10.6
	2016/2017	4.4537	4679	1051	4189	941	-490	-10.5
	2017/2018	4.5993	4722	1027	4350	946	-372	-7.9
Taxable income*	2015/2016	4.4176	394	89	605	137	+211	+53.4
	2016/2017	4.4537	341	76	611	137	+270	+79.2
	2017/2018	4.5993	403	88	714	155	+311	+77.2
Net income + subsidies	2015/2016	4.4176	1052	238	2191	496	+1139	+108.4
	2016/2017	4.4537	1074	241	2272	510	+1198	+111.5
	2017/2018	4.5993	1145	249	2409	524	+1264	+110.4
Net income rate + subsidies	2016	%	18.3		35.1		+28.1 p.p	
	2017	%	15.3		27.9		+29.1 p.p	
	2018	%	12.5		21.3		+28.9 p.p	

Source: ADER Project 13.1.2, own calculations; * idem.

From the horizontal analysis of data, it results that the profitability rates of organic rapeseed are higher than in the case of conventional rapeseed, by 28.1% in 2016, by 29.1% in 2017 and 28.9% in 2018. The vertical analysis of data shows an increase of the profitability rate in 2018 compared to 2016 by 1.6 p.p. in conventional rapeseed and 2.4 p.p. in organic rapeseed.

Conclusion: Rapeseed cultivation in both conventional and organic systems is cost-effective. The profitability of rapeseed crop farming is ensured not only by the subsidies received but also by the capitalization price.

The economic value of organic **soybean** production in 2018 shows an increase by 3% (+186 RON) compared to conventional soybean (column 6 vs. column 4) (Table 4 – line 1, col. 8 and 9). Subsidies are on the average by 127% higher for organic soybean compared to conventional soybean (Table 4 – line 9, line 2).

Table 4

Soybean

Indicators	Year of production-harvest	Euro value	Soybean Conventional		Soybean Organic		Variations Organic/Conventional	
			4500 kg/ha		3500 kg/ha		Absolute values (col. 6–4)	100 – (col. 8/col. 4) * 100 (± %)
			lei	euro	lei	euro	lei	%
1	2	3	4	5	6	7	8	9
Production value	2016	4.4176	6070	1374	5873	1329	-197	-3.3
	2017	4.4537	5955	1337	5918	1329	-37	-0.6
	2018	4.5993	6180	1344	6366	1384	+186	+3.0
Subsidies	2016	4.4176	2156	488	3119	706	+963	+44.7
	2017	4.4537	1922	432	2893	650	+971	+50.5
	2018	4.5993	1689	367	2692	585	+1003	+59.3
Total expenditures	2016	4.4176	5900	1336	5890	1333	-10	-0.2
	2017	4.4537	5475	1229	5613	1260	+138	+2.5
	2018	4.5993	5303	1153	5636	1225	+333	+6.3
Taxable income*	2016	4.4176	170	38	-17	4	-187	-110.5
	2017	4.4537	480	108	305	69	-175	-36.4
	2018	4.5993	877	191	730	159	-147	-16.7
Net income + subsidies	2016	4.4176	2298	520	3104	703	+806	+35.1
	2017	4.4537	2325	522	3149	707	+824	+35.5
	2018	4.5993	2426	527	3305	719	+879	+36.3
Net income rate + subsidies	2016	%	41.8		56.1		+14.3 p.p	
	2017	%	44.4		60.0		+15.5 p.p	
	2018	%	47.9		62.7		+14.7 p.p	

Source: ADER Project 13.1.2, own calculations; * idem.

Total expenditure for organic soybean compared to conventional soybean is higher by 2.5% (in 2017) and by 6.3% (in 2018), except for in the year 2016,

when a slight diminution of expenditure by 0.2% was noticed. The analysis of the income/expenditure ratio shows that between the rate of intermediate consumption expenditure and the rate of the economic value of production, there was correlation between the effort made and the economic effect obtained. It is estimated that the income/ expenditure ratio in organic soybean crop is greater than one, i.e. 1:1.05 in 2017 and 1:1.13 in 2018s), except for 2016, when a certain decrease in the income/ expenditure ratio was noticed (1:0.99 in 2016). Compared to the soybean grown under organic system, in conventional soybean the income/expenditure ratio is greater than one (1:1.03 in 2016, 1:1.09 in 2017 and 1:1.17 in 2018), which means that the correlation efficiency between the indices of the two variables was respected.

The taxable income obtained from organic soybean compared to conventional soybean farming (columns 8 and 9, line 4) diminishes, on the average, by 509 RON (-33.3%) (columns 8 and 9, line 4). The situation changes in the case of the net income + subsidy indicator values. Thus, organic soybean is more profitable than conventional soybean, by +806 RON in 2016 (+ 35.1%), +824 RON in 2017 (+ 35.4%) and +879 RON in 2018 (+36.2%) (columns 8 and 9, line 5).

From the horizontal analysis of data, the profitability rates for organic soybeans are higher than for conventional soybean, by 14.3 p.p. in 2016, by 15.6 p.p. in 2017 and by 14.8 p.p. in 2018. The vertical analysis of data reveals the increase of the profitability rates in 2018 compared to 2016 by 6.1 p.p. in conventional soybean and by 6.6 p.p. in organic soybeans.

Conclusion: The profitability of the soybean crop farming is ensured not only by the subsidies received but also by the recovery price.

The economic value of organic **sugar beet** production in the year 2018 averagely decreased by 52.9% (-6570 RON) compared to conventional sugar beet (column 6 vs. column 4) (Table 5 – columns 8 and 9, line 1). Subsidies are by 127% higher on the average for organic sugar beet than for conventional sugar beet (Table 5 – column 9, line 2).

Total expenditure in organic sugar beet compared to conventional sugar beet is lower by 9.3% in 2016, by 5.3% in 2017 and by 5.6% in 2018 (Table 5 – column 9, line 2). The analysis of the incomes/expenditures ratio shows that between the rate of intermediate consumption expenditure and the rate of the economic value of production, the correlation between the effort made and the economic effect obtained was respected. It is estimated that the incomes/expenditures ratio in organic sugar beet crop is greater than one: 1:1.36 in 2016, 1:1.29 in 2017 and 1:1.39 in 2018. Compared to the organic sugar beet, in conventional sugar beet, the incomes/expenditures ratio is also greater than one (1:1.58 in 2016, 1:1.47 in 2017, and 1:1.53 in 2018), respecting the correlation of efficiency between the indices of the two variables.

Table 5
Sugar beet

Indicators	Year of production-harvest	Euro value	Sugar beet Conventional		Sugar beet Organic		Variations Organic/Conventional	
			70000 kg/ha		45000 kg/ha		Absolute values (col. 6-4)	100 – (col. 8/col. 4) * 100 (± %)
			lei	euro	lei	euro	lei	%
1	2	3	4	5	6	7	8	9
Production value	2016	4.4176	11550	2615	9000	2037	-2550	-22.1
	2017	4.4537	12250	2751	10170	2283	-2080	-17.0
	2018	4.5993	14000	3044	12060	2622	-1940	-13.9
Subsidies	2016	4.4176	3371	763	4334	981	+963	+28.6
	2017	4.4537	4710	1057	5681	1275	+971	+20.6
	2018	4.5993	4656	1012	5659	1230	+1003	+21.5
Total expenditures	2016	4.4176	7319	1657	6638	1503	-681	-9.3
	2017	4.4537	8315	1867	7873	1768	-442	-5.3
	2018	4.5993	9160	1992	8646	1880	-514	-5.6
Taxable income*	2016	4.4176	4231	958	2362	535	-1869	-44.2
	2017	4.4537	3935	883	2297	516	-1638	-41.6
	2018	4.5993	4840	1052	3414	742	-1426	-29.5
Net income + subsidies	2016	4.4176	6925	1568	6318	1430	-607	-8.8
	2017	4.4537	8015	1800	7610	1709	-405	-5.1
	2018	4.5993	9012	1959	8526	1854	-486	-5.4
Net income rate + subsidies	2016	%	94.6		95.2		+0.6 p.p	
	2017	%	96.4		96.7		+0.3 p.p	
	2018	%	98.4		98.6		+0.2 p.p	

Source: ADER Project 13.1.2, own calculations; * idem.

The taxable income obtained from the organic sugar beet cultivation compared to the sugar beet cultivated in conventional system is down by 4933 RON (-38.4%) (columns 8 and 9, line 4). The situation changes in the case of the net income + subsidy indicator values. Thus, in the sugar beet grown under organic system, the incomes obtained are lower compared to the conventional system (by 607 RON in 2016 (-8.8%), by 405 RON in 2017 (-5.1%) and by 486 RON in the year 2018

(-5.4%) (columns 8 and 9, line 5).

From the horizontal analysis of data, the profitability rates for organic sugar beet are higher than in the case of conventional sugar beet, by 0.6 p.p. in 2016, by 0.3 p.p. in 2017 and by 0.2 p.p. in 2018. From the vertical analysis of data, it results an increasing trend of profitability rates in 2018 as compared to 2016, by 3.8 p.p. in conventional sugar beet and by 3.4 p.p. in organic sugar beet.

Conclusion: The profitability of sugar beet farming is ensured by the subsidies received.

5. CONCLUSIONS

From the comparative economic analysis of the 5 crops cultivated under conventional system and organic system, we cannot speak of the increase of the added value, except for the rapeseed crop, where the economic results, obtained during the three years of production, are positive for the taxable income indicator (income without subsidies). Not the same thing can be said about the analyzed cereal crops (wheat and maize).

Cereals continue to remain in the preference of Romanian farmers, both under conventional and organic system, due to the advantages they provide, i.e. fully mechanized farm works, non-perishability, high yields, etc.

For soybean and sugar beet crops, sustained efforts are being made to maintain the areas under these crops, so coupled support is provided in addition to direct payments (coupled support for soybean cultivation will help maintain a certain level of production and lower Romania's dependence on vegetable protein and raw sugar imports) and national transitional aids (NTA 6 for sugar beet), aiming at expanding the areas under sugar beet.

We tend to believe that a market for organic products is being created, as there is a certain type of consumers of organic products who once they got used to consume such products, they will continue to look for them. Future research should take into consideration the organic farming system to see if this will maintain its development trend in the context of the CAP programming beyond 2020.

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