Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 22, Issue 2, 2022
PRINT ISSN 2284-7995, E-ISSN 2285-3952

COMPARATIVE STUDY ON THE LEVEL OF PRODUCTION COSTS IN ORGANIC AND CONVENTIONAL AGRICULTURE IN ROMANIA

Valentina Constanța TUDOR, Gabriela Florentina GIMBĂȘANU, Alexandru FÎNTÎNERU, Alina Gabriela MĂRCUȚĂ, Claudiu Stelică COADĂ, Ruxandra Florina TEODORESCU

University of Agronomic Sciences and Veterinary Medicine from Bucharest, 59, Marasti Boulevard, District 1, 011464, Bucharest, Romania, Emails: tudor.valentina@managusamv.ro, gimbasanugabriela@yahoo.com, fintineru.alexandru@managusamv.ro, marcuta.alina@managusamv.ro, claudiu.coada@yahoo.com, ruxandra.teodorescu@nndkp.ro

Corresponding author: ruxandra.teodorescu@nndkp.ro

Abstract

The concept of sustainable development appeared in the attempt to reconcile agri-food production with measures to conserve non-renewable resources, but also the attempt to protect the environment, and in this process the farmer has an important role given the effects that specific activities have so much on the environment. Because of this, more and more actors involved in this process, from farmers to consumers, but also politicians have begun to pay more attention to organic farming, as an advantageous means of reconciliation between man and nature. In this paper we aim to analyze the production costs recorded in six crops, both in the case of applying the conventional production system and in the case of applying the ecological system in Romania, in order to determine the profitability of those crops. The research methodology involved the use of existing data in domestic and international databases, but also data collected through the project ADER 23.1.1. Technical and economic substantiation of the production costs and estimates regarding the capitalization prices of the main vegetal and animal products, obtained in conventional system and in ecological agriculture, data that were processed, analyzed and which formed the basis for formulating conclusions. The conclusion was that sugar beet and sunflower are profitable crops both in the conventional and organic system, while rape, soybean, rice and hemp registered losses which have to be covered by subsidies. Income depends on production performance and selling price, in the both systems, and case of organic products is inversely proportional.

Key words: *organic agriculture, conventional agriculture, cost, profitability*

INTRODUCTION

As the world becomes more and more concerned with protecting the environment, its own health, animal welfare, organic farming has become an increasingly current concept, even if it is not new. Given that it is an agricultural production management system, it protects the environment due to the fact that it allows the renewal of resources, recycling, and the resulting products are much healthier, due to the fact that they reduce or eliminate the use of pesticides, synthetic fertilizers, other substances chemical, but also genetic manipulation practices, arising from the need to get more and cheaper food [3]. The same principles are applied for obtaining animal products, avoiding the use of antibiotics, growth hormones, but also pursuing animal welfare. Thus, this type of agriculture responds to the demand of consumers who are concerned with the use of sustainable practices, environmental protection, animal welfare and who want to consume products obtained respecting these principles [4].

At the same time, Community agricultural policies are geared towards natural agriculture, in which organic farming is well defined, and measures to promote organic production techniques are supported at European level, with financial support [10].

In the Codex Alimentarius Commission, organic farming is defined as "a holistic approach to the production management system, which promotes and maintains the healthy development of agro-ecosystems, including biodiversity, biological cycles and

soil biological activity. The emphasis is on the use of managerial practices in accordance with the use of external inputs from the farm, considering the regional conditions to which the systems must adapt. This is achieved by using, where conditions allow, agricultural, biological and mechanical methods, as opposed to the use of synthetic substances, to perform any specific function in the system with use" [6].

Another definition was proposed in 2008 at the International Federation of Organic Agriculture Movements (IFOAM) General Assembly in Italy: "organic farming combines tradition, innovation and science for the benefit of the environment and promotes fair relations and a good quality of life for all involved" [7].

Given all these advantages, organic farming has begun to have more and more supporters, being considered a viable alternative to conventional agriculture [9], developing both globally and nationally [2].

In this context, the purpose of the paper was to analyze production costs recorded by six crops (sugar beet, sunflower, rape, soybean, rice and hemp), both in the case of applying the conventional and organic production system, in order to compare the profitability.

MATERIALS AND METHODS

The researches were carried out starting from the statistical data provided by the Ministry of Agriculture and Rural Development, as well as from the data published by the National Institute of Statistics and Eurostat regarding the ecological agriculture and the way of practicing it. The analysis also involved the processing of data collected within the project " Agriculture and Rural Development - ADER 23.1.1. The analyzed time period is between 2015-2019. The Technical and economic substantiation of the production costs and estimates regarding the capitalization prices of the main vegetal and animal products, obtained in conventional system and in ecological agriculture for 2020.

To make comparisons between the results of conventional agriculture and organic farming, we used statistical methods: Fixed-base index method and Chain-based index method, which reflected the dynamics of the phenomenon analyzed. These indices were determined as the ratio between the level of the compared indicator and the level of the indicator used as a basis for comparison. The calculation relationship used were:

$$I_{t/1}=y_t/y_1;\ I_{t/t-1}=y_t/(y_{t-1}); \quad [1]$$

where:

y_1 - the level of the indicator in the reference period;

y_t - the level of the indicator in period t;

y_{t-1} - the level of the indicator in the period t-1.

RESULTS AND DISCUSSIONS

According to the Research Institute of Organic Agriculture (FiBL statistics), Europe ranks 2nd in terms of agricultural area used for organic farming, with Oceania ranking 1st. At the U.E. level. in 2019 there were 13.79 million ha converted or are being converted in terms of organic agriculture, increasing by 9% compared to 2017 (12.6 million ha) and by 46% compared to 2012 (Fig. 1).

Romania recorded an increase of 37% during this period, from 288 thousand ha in 2012 to 395 thousand ha in 2019, placing it among the countries with an increased conversion. However, the area destined for organic crops is the smallest in the European Union, of about 2%, given that the growth potential exists. Eurostat data show that in Romania there are about 33% of all agricultural farms in the EU, but about 70% of them have an area of less than 2 ha. The data also show that the number of organic farms in Romania is about 0.1%.

In these conditions, there is a need to promote organic crops, to apply agricultural policies that encourage the transition to this system of culture.

As we mentioned before, in Romania the area occupied by organic crops increased in the

period 2015-2019 by 62%, this growth rate being above the European Union average.
The evolution of the arable area occupied by organic crops decreased in 2017 in the EU, the decrease being almost 50% compared to 2015. Subsequently, this area registered increases of 28% in 2018 compared to 2015 and 40% in 2019 compared to the same year (Fig. 1).

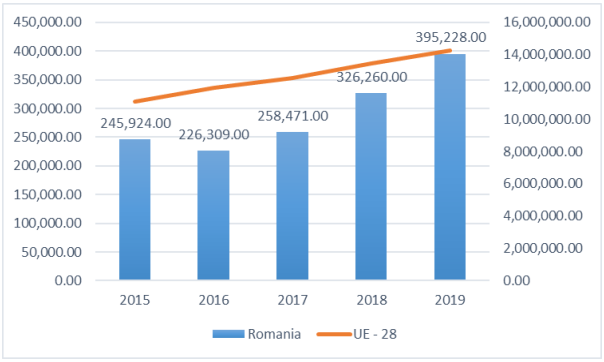

Fig. 1. Evolution of areas occupied by organic crops, Romania and U.E. (hectares)
Source: [5].

In Romania, the arable land areas destined for organic crops have increased since 2015. After a decrease of 1.5% in 2016, the increases were 22% in 2017 compared to 2015 and 51% in 2018, respectively 62% in 2019.
In the following we will analyze starting from the situation of the areas cultivated with sunflower, soybean, rapeseed, sugar beet, rice and hemp in the period 2015-2019, the production costs registered for these crops in 2020, both for the conventional system and for the ecological one (Fig. 2).

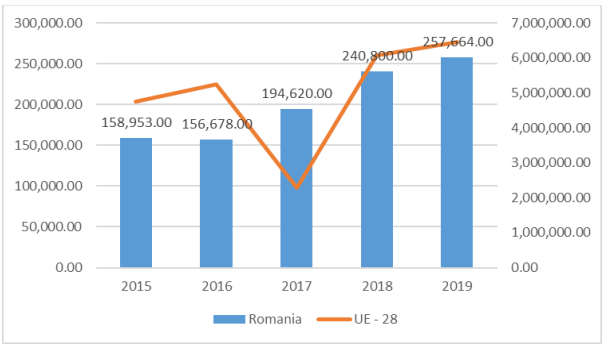

Fig. 2. Evolution of arable land for organic crops (ha)
Source: [5].

The data registered in the statistics of the National Institute of Statistics show that in the period 2015-2019 the area occupied by sunflower crops varied between 998.4 thousand ha in 2017 and 1,282.6 thousand ha in 2019 (Fig. 3).

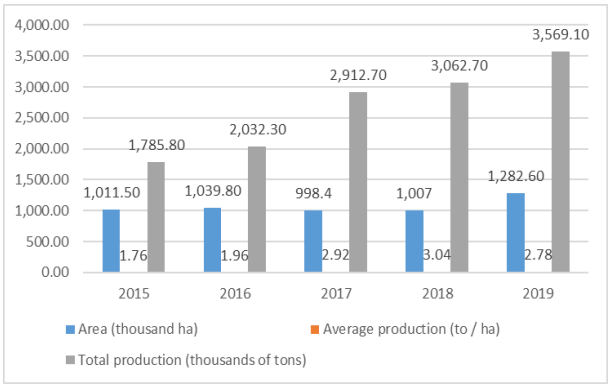

Fig. 3. Evolution of areas, average production and total sunflower production
Source: [8].

Compared to 2018, the total production increased by 14% in 2016, by 63% in 2017, by 72% in 2018 and doubled in 2019. It is found that these increases were due not only to the increase of areas, but also to average yields per hectare which increased from 1.76 to/ha in 2015 at 2.78 to/ha in 2019.
Regarding the area cultivated with soybeans, the increases were between 23% in 2019 compared to 2015 and 32% in 2018 compared to 2015 (Fig. 4).

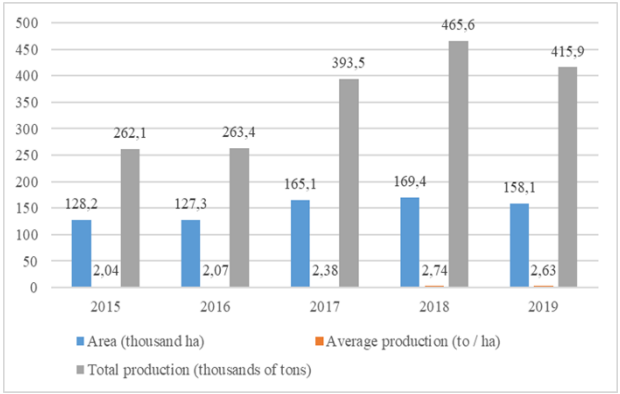

Fig. 4. Evolution of areas, average production and total soybean production
Source: [8].

However, we find that in the conditions of continuous growth of average production, by almost 30% in 2019 compared to 2015, the total production decreased in 2019 by 11%

compared to 2018, against the background of the decrease of cultivated areas by 7%. The year in which the largest production of 456.6 thousand tons was registered was 2018, the year in which the surface of this crop was almost 170 thousand ha (Fig. 4).

The rape, due to the favorable weather conditions in 2017, recorded the highest production in the analyzed period, this being 1,673.3 thousands of tons. This year the average production increased by 16% compared to 2015. In 2019, the average production was the lowest in the analyzed period, and given that the cultivated area was 352.6 thousand ha, the total production approached 800 thousand tons (Fig. 5).

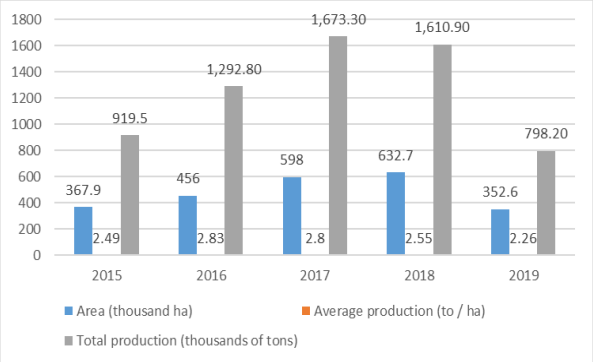

Fig. 5. Evolution of surfaces, average productions and total rape production
Source: [8].

In sugar beet, the year in which both the average production and the cultivated area were the highest was 2017.

This determined an increase in total production of 13% compared to 2015 due to the 6% increase in both average production and the cultivated area. In 2019, although the average production increased reaching approximately 41 tons/ha, due to the reduction of the cultivated area, the total production was 945 thousand tons.

Areas cultivated with flax and hemp increased compared to 2015. The highest increase, more than 4 times was recorded in 2017. Also, in 2018 and 2019 the increase was 350%, but the highest total production was recorded in the year 2016, this being over 370,000 tons.

Compared to 2015, in 2019 the total production increased by approximately 60%.

All these statistical data highlight the development potential of some cultures that are not part of the category of those traditionally cultivated on large areas, but also the possibility of expanding the areas grown organically (Fig. 6).

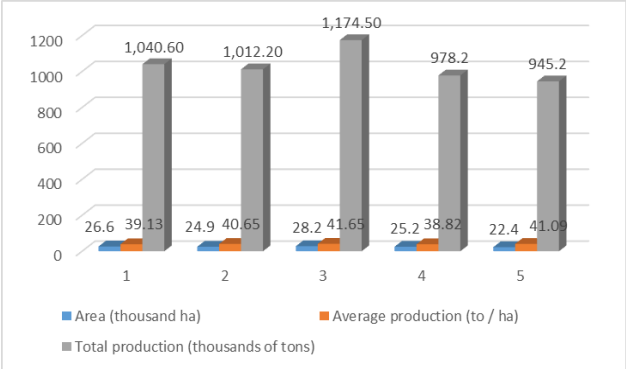

Fig. 6. Evolution of surfaces, average productions and total production at sugar beet
Source: [8].

In the following paragraph we will analyze the comparative economic indicators that reflect the economic efficiency of these cultures, both for the conventional system and for the ecological system.

Data on production costs show us that the lowest costs are recorded for hemp and sugar beet. Thus, if for the conventional culture system, the sugar beet has a cost of 34.36 euro/ton, in the ecological system it is 45.68 euro/ton, higher by 33%.

For hemp, the cost per ton in the conventional system is 34.77 euro, and in the ecological system it is 28% higher.

The highest production cost is recorded for soybeans, where the cost per ton was 486.94 euro in the organic system, being 53% higher than the conventional system. Also, for rice the cost in the organic system was 34% higher than by the conventional system.

The smallest differences were recorded for sunflower, where the cost difference was 6% and for rapeseed where the difference between the two cropping systems was 19%.

Regarding the average productions, there are also significant differences here. Thus, if for sunflower and hemp the average productions for the conventional system are higher by 25%, respectively 29%, for soybeans the average production is double the conventional

insistence compared to the ecological one, and for rapeseed the average production is 50% higher (Fig. 7).

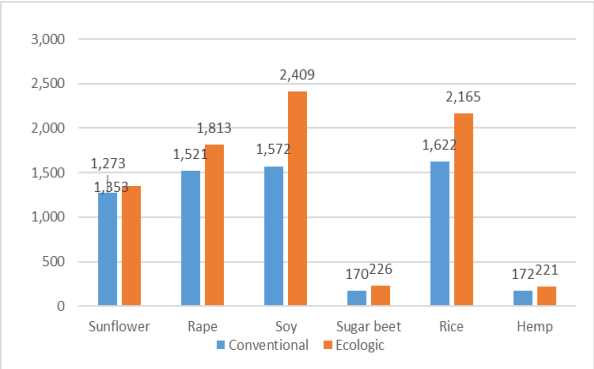

Fig. 7. Situation of production costs, for the analyzed crops (euro)
Source: [8].

Comparing the costs with the profit obtained, we find that five of the six crops analyzed record a profit rate for the conventional system (sunflower 3.4%, rapeseed 3.1%, sugar beet 18.2% and hemp 3.1%). Rice is the only crop with losses for both cropping systems. The most profitable crop is sugar beet, which has a 0.4% higher profit rate in the case of organic farming compared to the conventional system (Fig. 8).

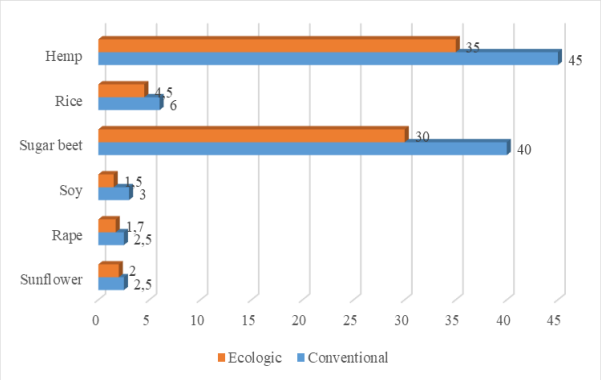

Fig. 8. The situation of the average productions, at the analyzed crops
Source: [8].

We can notice the rates of losses registered in the ecological system for rapeseed, soybean, rice and hemp. The highest rate of losses is recorded in soybeans (approximately 17% 0), and the lowest rate of losses is recorded in hemp (approximately 3%).

The calculations were made without considering the financial support granted in the form of subsidies (Fig. 9).

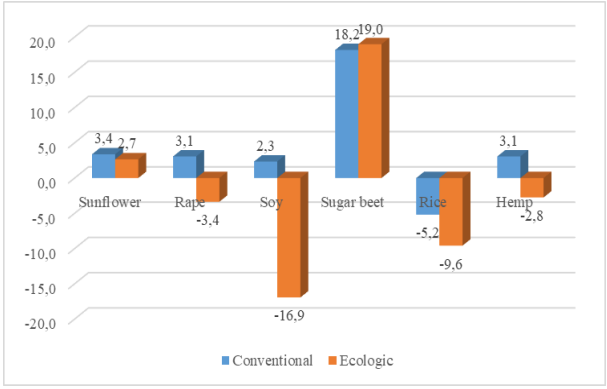

Fig. 9. Profit rate situation for the analyzed crops (%)
Source: [8].

CONCLUSIONS

Based on the analyzed data, it is found that, without considering the subsidies granted, some of the crops in the case study proved to be profitable, both in the conventional system and in the ecological system (sugar beet and sunflower). For the other four crops analyzed (rape, soybeans, rice and hemp) there were losses, but these can be covered by subsidies, the level of income depends on both the level of production obtained, but also the selling prices, which in the case of products ecological is inversely proportional.
The aspect that must be considered, however, is the one related to the level of production obtained, a level that can influence the choices that farmers make regarding the chosen crop system.

ACKNOWLEDGEMENTS

We thank the referees for all the data provided for this paper. The publication of this article was possible thanks to the sectoral project ADER 23.1.1: “Technical-economic basis of production costs and estimates regarding the prices of capitalization of the main plant and animal products, obtained in conventional system and in organic farming” Subcontract no: 23.1.1./2-03.10.2019 contracted with the Ministry of Agriculture and Rural Development.

REFERENCES

[1]Anghelache, C., Manole, A., 2012, Dynamic/ chronological series (time) - theoretical presentation, structure, relations between indices, Romanian Statistical Review no. 10.
[2]Angelescu, A. I., Dona, I., Resit (Alim) I. D., 2021, Aspects regarding the evolution of the number of operators in organic agriculture in Romania and in Prahova county, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 21(2), 55-60.
[3]Brătulescu (Manolache), A. M., Mărcuță, A., 2019, Comparative analysis of technical indicators for conventional and ecological agriculture, In: Agrarian Economy and Rural Development - Realities and Perspectives for Romania. International Symposium. 10th Edition, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 236-240.
[4]Brătulescu (Manolache), A. M., Petre, I. L., Marcuta, L., Marcuta, A., 2019, The necessary of labor force in the two conventional and ecological agricultural systems, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 19(2), 31-34.
[5]Eurostat, 2020, Organic farming in the EU A fast growing sector, https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/market-brief-organic-farming-in-the-eu_mar2019_en.pdf, Accessed on 15.09.2021.
[6]FAQ, What Is Organic Agriculture, http://www.fao.org/organicag/oa-faq/oa-faq3/en/, Accessed on 8.06.2021.
[7]IFOAM, Definition of organic agriculture, 2008, https://www.ifoam.bio/why-organic/organic-landmarks/definition-organic, Accessed on 8.09.2021.
[8]National Institute of Statistics, 2020, Tempo online, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table, Accessed on 8.09.2021.
[9]Popescu, A., Pop, C., 2013, Considerations regarding the development of organic agriculture in the world, the EU-27 and Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13(2), 323-329.
[10]Tindeche, C., Marcuta, A., Marcuta, L., 2014, Importance of the agricultural sector as a branch of the national economy, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14(4), 299-305.