

## THE EVOLUTION OF CULTIVATED AREAS AND THE PRODUCTIONS OBTAINED AT FOUR AGRICULTURAL CROPS CULTIVATED IN A CONVENTIONAL AND ECOLOGICAL SYSTEM IN THE PERIOD 2016-2020 IN CĂLĂRAȘI COUNTY

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### Abstract

*Organic farming is becoming more and more important and is constantly expanding. This development is supported by the growing demand of consumers for organic agricultural products, who are becoming more aware and interested in health insurance through the consumption of products, to which are added the requirements of society for sustainable agricultural development and the multitude of favorable effects at the level of the farm and the environment. Organic farming is an agricultural method that aims to produce food using natural substances and processes. Therefore, it has a limited impact on the environment because it encourages: responsible use of energy and natural resources, conservation of biodiversity, conservation of regional ecological balances, increasing soil fertility, maintaining water quality. EU regulations on organic farming aim to provide a clear structure for the production of organic products throughout the EU. Călărași County has, according to specialists in the field, the most productive land in Bărăgan. The purpose of this paper was to present the situation of organic agriculture in relation to conventional agriculture in Calarasi County, in terms of cultivated areas and average production, as well as a brief analysis of data on access to European funds in the county.*

**Key words:** conventional agriculture, ecological agriculture, areas, productions.

### INTRODUCTION

Organic farming has seen a continuous increase in acreage in the last decade, both globally and in our country, associated with the diversification of organic production and an increasingly better organization of the ecological system (Toader, 2014).

A study conducted and published by the European Commission in April 2014, concluded the comparison between the two agricultural models - organic and conventional - to see which is more profitable (Sava et al., 2006). Research has been done on the economic aspects, from the initial costs and efficiency of farms, to the price of dairy products and cereals in Central and Western Europe. Research has shown that organic

farming in some cases yields slightly higher incomes. When the initial costs of pesticides, fertilizers or fuel for harvesting are taken into account, organic farming has some advantages (Toderoiu, 2006).

However, mechanization creates environmental risks because it does not differ from the conventional one in terms of fuel for agricultural work (Balteanu, 2003).

The main conclusion of the study is the existence of small differences between the two agricultural models when it comes to invested capital, but the expenditure is aimed at obtaining certifications and investing in special equipment (Samuel, 2007). The big differences are visible when the focus shifts to the social and environmental benefits of organic farming: larger crops with cheap investment largely

based on biodiversity; food safety, exclusion of risks by replacing chemicals with renewable resources; crop resistance in drought or heavy rains; (Sin et al., 2005). Organic farming is the main source of healthy food for the population, as well as a real solution to reduce environmental pollution, because the process and procedures for obtaining organic products are governed by strict rules and principles (Bonciu & Soare, 2013). The ecological basis in the time lasting agriculture, is ensured by reducing or eliminating pesticides, chemical fertilizers inputs, rebuilding, maintaining or improving the quality of the soil, but also by stimulating the natural processes, that control the populations of the different organisms considered to be damaging (prejudicial) (Miron, 2015).

Compliance with the rules and principles for the production of organic crops is regulated by national legislation (Oancea, 2003). The control of the entire technological process of obtaining such a product is done by inspection and certification bodies (Sandoiu & Stefanic, 2006). A new IFOAM Organics Europe report highlights how much of the CAP's national budgets will have to be devoted to organic farming in all Member States to reach the EU's average target of 25% organic land by 2030 of the Farm to Fork and Biodiversity Strategy. According to research commissioned by IFOAM Organics Europe, the European Union should dedicate 3 to 5 times the current amount of the CAP budget dedicated to the conversion and maintenance of organic farming from 2023 (Land and soil in Europe, 2020, Nov 23). Depending on their potential national target, reference and payment rates. In some cases, Member States should devote 10 times the national budget to organic support measures (Sin et al., 2005).

Conventional farmers should be encouraged to switch to organic farming, and organic farmers should be properly rewarded for the public goods they deliver, producing quality food while protecting nature (Bologa, 2013). Increased support for organic farming is a smart public policy tool to ensure that the next CAP will contribute to the green agreement and the goals of the Farm to Fork and Biodiversity Farm strategies. Achieving 25% organic land in the EU by 2030 will only be achievable if Member

States devote a much larger share of the CAP budget to organic conversion and maintenance than is currently the case in most countries (Ecological Agriculture).

Achieving 25% organic land in the EU by 2030 would require the EU to: triple its organic land area between 2019 and 2030, increase global CAP spending 3-5 times by 2030, dedicate 9-15% of the CAP budget for organic (instead of 3% as in 2018), to require Member States to reach 25% organic land by 2030, to increase payment rates per hectare before 2030 - to take into account rising costs, as payments were last established in 2014; According to IFOAM Organics Europe, Member States should include a national target for organic land in their strategic CAP plan, based on an analysis of the production needs of the organic sector and its contribution to the CAP (Zahiu et al., 2010).

## MATERIALS AND METHODS

In order to correctly reproduce the cultivated areas and the obtained productions, both in conventional and ecological system, data provided directly by the Agricultural Directorate of Călărași County and by the Ministry of Agriculture and Rural Development in Romania were collected (Vegetable agricultural production of the main crops, by counties and localities). We also used the data provided by the Agency for the Financing of Rural Investments (AFIR) to assess the way in which financing with European money was accessed. Through the National Rural Development Program 2014-2020 (PNDR 2020), 1,238 compliant financing applications were submitted for investments in Călărași County, amounting to 296.3 million euros. In total, 855 farmers, processors, entrepreneurs and public authorities have concluded contracts with the Agency for the Financing of Rural Investments (AFIR) to receive non-reimbursable financing through PNDR 2014-2020 in a total amount of 163.1 million euros. So far, 610 investment projects have been completed, financed with approximately € 47 million, European non-reimbursable funds. Most of the investments financed by the Agency for Financing Rural Investments (AFIR) in Călărași County were those for

investments in agricultural holdings through sub-measure 4.1 (104 farms contracted funds of over 52 million euros) and for the installation of young farmers (55 young people contracted funds of over 2.1 million euros).

For the processing of agricultural products, 20 projects for the modernization and development of processing units were contracted, the value of non-reimbursable financing being over 16.1 million euros. By making the investments contracted through PNDR 2020, at the level of Călărași county, AFIR made payments in the beneficiaries' accounts in a total amount of over 85 million euros.

The Unique Identification Register managed by APIA Călărași County Center includes 23,785 active farmers (who are not registered or deceased in RUI), who reside/have their headquarters in Călărași County, registered since June 2005.

## RESULTS AND DISCUSSIONS

### The dynamics of the surfaces at the level of Călărași County and the productions obtained for wheat, barley, corn and sunflower, in the interval 2016-2020

The agricultural and arable area of Călărași County did not undergo significant changes in the period 2016-2020 (Table 1). The exception is the year 2020 when the agricultural area decreased compared to 2019, by 873 hectares and the year 2018 when it increased by 289 ha compared to 2017.

Table 1. The dynamics of the agricultural surfaces in Călărași County, during 2016-2020

Year	Agricultural surface	Arable surface
	ha	ha
2016	424,927	409,984
2017	424,927	409,947
2018	425,216	409,206
2019	425,217	409,202
2020	424,344	408,758

Source: Călărași Agricultural Direction

The arable area decreased in 2020, when 408,758 ha were registered compared to 2019, when they were registered with 444 hectares less. Compared to 2016, when the largest arable

area was 409,984 hectares, the decrease recorded in 2020 was 1,226 hectares (Figure 1).

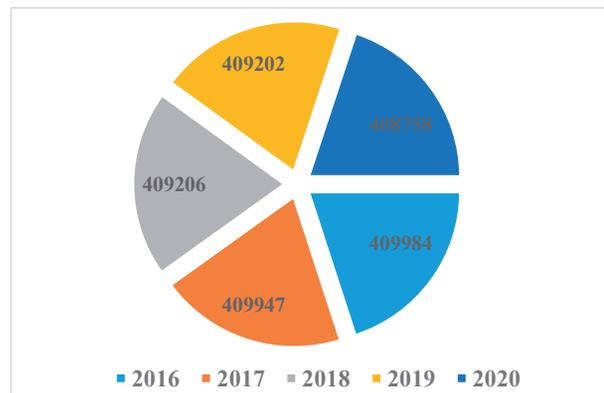


Figure 1. Arable areas in Călărași County, between 2016-2020  
(Source: own processing)

### Areas cultivated with wheat, barley, corn and sunflower in Călărași County, in the period 2016-2020 (conventional system)

If at the national level, from the point of view of the surfaces, the most cultivated cereal is the corn, at the county level the corn and the wheat culture are the ones that dispute their first place, the differences between the cultivated surfaces being very small. The area cultivated with wheat, at the level of Călărași County underwent changes during 2016-2020. The smallest area was cultivated in 2017, 111,128 ha and the largest area was cultivated in 2018, the difference between the two years being 11,242 ha. The area cultivated with barley, in the analyzed period, 2016-2020, shows considerable changes from one year to another. The smallest area cultivated with barley was registered in 2018, namely 18,776 ha, at the opposite pole, the largest area cultivated with barley was registered in 2020, the difference between the two years being 16,387 hectares (Table 2). The areas cultivated with corn also fluctuated from one year to the next. In 2016, in Călărași County there were 112,320 hectares cultivated. The following year, 2017, the cultivated area decreased by 4944 hectares, reaching 107,376 ha. Then the areas cultivated with corn increased two years in a row, in 2018 they increased by 3,678 ha, and in 2019, compared to 2017, they increased by 23,976. In 2020, maize was cultivated on an area of 116,129, decreasing, compared to the previous year, by 15,223 ha.

Table 2. Cultivated areas evolution of studied cultures, in Călărași County, during 2016-2020

Culture	Cultivate areas - ha				
	2016	2017	2018	2019	2020
Wheat	118,194	111,128	122,370	120,564	112,974
Barley	35,163	25,656	18,776	24,454	25,675
Corn	112,320	107,376	111,054	131,352	116,129
Sun flower	33,780	37,322	40,802	40,003	36,636

Source: Călărași Agricultural Direction

The areas cultivated with sunflower in the period 2016-2020, did not undergo significant changes, there are small increases from one year to the next, except for the year 2020 when the area cultivated with sunflower (36,636 ha) decreased by 337 ha, remaining however higher than in the first year analyzed, 2016 when this crop occupied 33,780 ha.

#### Average yields obtained per hectare, for the four crops analyzed, in the period 2016-2020, in Călărași County

Regarding the average productions obtained, at the level of Călărași County, for the four cultures analyzed, in the period 2016-2020, there is a similar dynamic (Table 3).

Table 3. Average production, kg/ha

Culture	Average production kg/ha				
	2016	2017	2018	2019	2020
Wheat	4,877	5,413	5,549	5,492	1,546
Barley	6,118	5,743	5,717	5,903	2,670
Corn	4,709	7,758	7,421	7,238	2,704
Sun flower	2,773	3,112	2,320	2,878	1,899

Source: Călărași Agricultural Direction

The average production per hectare for wheat increased for three consecutive years, in the period 2016-2018, then in 2019 it registered an insignificant decrease, with 57 kg per hectare, compared to 2018 (5,549 ha), the productions being approx. 5,000 kg. In 2020, due to the drought, wheat production fell sharply to only 1,546 kg per hectare. In the analyzed period, the average yields per hectare for barley cultivation decreased from 6.118 kg per hectare in 2016, to 5.903 kg per hectare in 2019. And for barley, the year 2020 brought a considerable decrease in production, reaching 2,670 kg per hectare. The average yields per hectare, for maize cultivation, in the period

2016-2018 increased. A significant increase was recorded in 2017 when production (7,758 kg) increased compared to 2016, by 3,049 kg per hectare. In 2019, the average production of corn, 7,238 kg, decreased compared to the previous year, by 183 kg per hectare. In 2020, there was a decrease of 37.35% compared to 2019, reaching 2,704 kg per hectare. Of the four crops analyzed, sunflower is the crop in which the dynamics of production obtained per hectare was accentuated (Table 3).

The highest average production obtained from sunflower was in 2017 is 3,112 kg per hectare, and the lowest production was recorded in 2020, 1,899 kg per hectare. The year 2020 was a year in which unfavorable climatic conditions had a major impact on yields per hectare.

#### Cultivated areas, at the level of Călărași County, with the crops of wheat, barley, corn and sunflower in the period 2016-2020 (ecological system)

Călărași County had the largest cultivated area in the ecological system in 2019, when 4,193.22 ha were registered, and the smallest area in 2017 (2,105.70 ha) (Table 4). The largest areas cultivated in ecological system, in Călărași county, are with wheat and sunflower. In wheat, the surfaces oscillate registering 595.53 ha cultivated in 2019 and 1,027.50 ha, in 2018. the significant area was cultivated in 2019, namely, 648.20 ha and the smallest, in 2017 when only 89.51 ha were sown with this crop. The areas cultivated in the ecological system with corn have evolved upwards, reaching 677.72 ha in 2020, as shown in Table 4. The barley crop occupied 302.17 ha in 2016, and then dropped drastically to 36.13 ha in 2019, in 2018 missing from the group of plants grown in the ecological system in the county.

Table 4. The cultivated areas in the ecological system in Calarasi County, between 2016-2020

Indicator	2016	2017	2018	2019	2020
Total areas - ha	2,743.66	2,105.70	3,581.10	4,193.22	3,542.72
Wheat	839.72	725.21	1,027.50	595.53	979.61
Corn	287.19	189.45	195.86	625.35	677.72
Barley	302.17	89.51	-	36.13	155.81
Sun flowers	304.60	289.65	580.40	648.20	487.18

Source: MADR

Table 5. The percentage of cultivated areas in ecological system of the total cultivated areas in Calarasi County

Culture	2016		2017		2018		2019		2020	
	Ha	%								
Wheat	119,033.72	0.71	111,853.21	0.65	123,397.50	0.83	121,159.53	0.49	113,953.61	0.86
Barley	35,465.17	0.85	25,745.51	0.34	-	-	24,490.13	0.14	25,830.81	0.60
Corn	112,607.19	0.25	107,565.45	0.17	111,249.86	0.17	131,977.35	0.47	116,806.72	0.58
Sun flower	34,084.60	0.90	37,621.65	0.77	41,382.40	1.42	40,651.20	1.21	37,123.18	1.32

Source: Own calculation

It is observed that the cultivated areas in ecological system, in Călărași County, during the 5 years studied, do not exceed 1% of the total cultivated areas for wheat, barley and corn crops (Table 5). In wheat cultivation, the highest percentage was recorded in 2020, namely, 0.86%. Barley cultivation had decreases of the cultivated areas in ecological system, from 0.85% in 2016 to 0.14%, in 2019. Regarding the corn culture, it had values of the share of cultivated areas in ecological system, from 0.17% in 2017-2018 at 0.58%, in 2020.

The sunflower crop was the only one of the studied crops that had values over 1% of organically cultivated areas of the total area, the values ranging between 0.77% in 2017 and 1.42% in 2018. Also, in 2019 and 2020, it the culture registered with superunitary values, 1.21%, respectively 1.32%.

## CONCLUSIONS

The agricultural and arable area of Călărași County has not undergone significant changes in the period 2016-2020, oscillating around 400,000 ha with lower values in 2018-2019.

The area cultivated with wheat, in conventional system, at the level of Călărași county registered fluctuations during the period 2016-2020 starting from 111,128 ha, in 2017 to 120,564 ha in 2019. The average productions exceeded 5,000 kg/ha in three of the 5 years analyzed. Only in 2020 the registered productions were low, 1,546 kg/ha, the year 2020 being an unfavorable year from the climatic point of

view. Wheat areas cultivated in ecological system, in Călărași County, they oscillated between 595.53 ha in 2019 and 1,027.50 ha in 2018, these areas meaning weights between 0.49%, in 2019 and 0.83%, in 2018 of the total areas cultivated with this culture.

The barley crop at the county level registered with decreasing areas in 2018 (18,776 ha) reaching in 2020 an area of 25,675 ha. The average production of barley grown in conventional system was over 5,000 kg/ha with a maximum in 2016 (6,118 kg/ha). Year 2016 at 36.13 ha in 2019. The share of areas cultivated with barley at county level reached a maximum in 2016, 0.85% and a minimum in 2019, 0.14%. In 2018, this culture was not found among the crops sown in the ecological system. The evolution of the areas cultivated with corn had an ascending trend, a fact due to the profitability of this culture but also to the reduced interventions with phytosanitary treatments. The average productions per hectare, in the system of conventional agriculture, have constantly increased from 4,709 kg/ha in 2016 to over 7000 kg/ha in 2017, 2018 and 2019. The year 2020 did not bring good results in agriculture, taking into account the factors unfavorable climatic conditions, this also having an impact on maize crops, when 2,704 kg/ha were obtained. The areas cultivated in ecological system, decreased starting with 2017 and 2018, over 180 ha, following a significant increase in 2019 and 2020, over 600 ha. These areas represented weights of the total cultivated area from 0.17% to 0.58%.

The evolution of the areas cultivated with sunflower, in conventional system was an increasing one, in the years 2018-2019 reaching over 40,000 ha. The average yields were over 2,300 kg/ha with a maximum yield in 2017, 3,112 kg/ha and a minimum in 2020, 1,899 kg/ha. The areas cultivated with sunflower in ecological system reached a maximum in 2019 reaching 648.20 ha. The share of areas cultivated with sunflower in ecological system from the total cultivated areas was 0.77 and 1.42% in the studied interval. The evolution of the cultivated areas, of the obtained productions, the attraction of the European funds for the development and modernization of the exploitations show us that the Romanian agriculture is on an ascending trend with Romanian or foreign capital. Călărași County is one of the counties in the country, leading the average grain production per hectare. Agriculture in Călărași County has evolved a lot in recent years, because Călărași farmers have accessed and continue to access European funds for the modernization of their farms. Although the European Union supports the development of this system of organic farming by providing subsidies, Romanian farmers are still reluctant to adhere to this type of environmentally friendly agriculture. All EU Member States need to draw up work plans for this, so that by 2030 the percentage of organically cultivated areas will reach 25% in each country. Romania currently has about 3% of the registered area in ecological system and Călărași County is below this value.

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