

## EXPLORING THE RISE OF ORGANIC AGRICULTURE IN EUROPE: COMPARATIVE ANALYSIS AND THE ROMANIAN PERSPECTIVE

Cosmina SMEDESCU, Dragoş SMEDESCU, Liviu MĂRCUȚĂ,  
Alina MĂRCUȚĂ, Valentina Constanța TUDOR

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania, E-mails: smedescu.cosmina@managusamv.ro, dragos.smedescu@managusamv.ro, marcuta.liviu@managusamv.ro, marcuta.alina@managusamv.ro, tudor.valentina@managusamv.ro

**Corresponding author:** smedescu.cosmina@managusamv.ro

### Abstract

*The primary aim of this article is to analyze the progression of organic farming at the European level, with emphasis on trends and changes in the cultivated area under this system. The article seeks to underscore the significance and benefits associated with organic farming, particularly in response to the detrimental effects of conventional agriculture on the environment and human health, and to provide relevant information for the promotion and adoption of sustainable practices in agriculture. In light of extensive research, agricultural experts have acknowledged the adverse environmental and health consequences of conventional agriculture over the course of several decades. Consequently, they have embraced organic farming, which draws inspiration from traditional farming methods spanning thousands of years. By employing statistical analysis and utilizing data from reputable sources, the study highlights the increasing prevalence of organic farming across Europe, specifically exploring the perspective of Romania.*

**Key words:** ecological agriculture, conventional agriculture, sustainable practices, conversion, environmental impact

### INTRODUCTION

The essence of life on Earth, whether animal or human, is fundamentally supported by nature, which provides us with food, shelter and for us humans, clothing. However, the increased pressures caused by the rapid growth of the human population and the ever-increasing demands, especially for food, began to strain nature's resources. In this context, we have become increasingly dependent on the production of our own food and materials for construction and clothing, by intensifying the use of the main elements of agriculture: soil, climate, plants and animals [1].

With the advent of the Green Revolution, to meet the growing demand for agricultural products, the conventional farming system was adopted [17]. But over time, as the pursuit of profit advanced, agriculture became more and more separated from nature [15]. Parallel to this process, human innovations have also advanced - mechanization,

chemicalization, irrigation, and more recently, genetic engineering. The result is an increasing and more harmful impact on nature, manifested by destructive phenomena such as floods, landslides, avalanches, reduction of natural soil fertility, pollution, desertification, etc [6]. Diseases affecting the immune systems of plants, animals and humans have also increased. Conventional agriculture, an essential component of the developing economic model [3], has pursued in the last decades the main objectives of any industry: the maximization of profits and the efficiency of the labor force [4, 18]. To achieve this, he tried to increase productivity, that is, the amount of agricultural products per unit area [12], and implemented mechanized technologies [1]. This process led to the application of intensive farming techniques, with a large capital invested in external resources. The results were impressive in terms of product quality and quantity, with a significant economic impact [11].

However, this success was not without consequences. The environmental impact has been substantial, including soil and water pollution, the disappearance of non-harmful but chemically sensitive insects, the development of pesticide resistance, and the loss of biodiversity [14].

In this context, organic agriculture is gaining more and more ground [19]. This trend is fueled by an increase in consumer demand for organic agricultural products as they become more aware of the impact of food on their health [13]. There is also increasing social pressure for sustainable agricultural development, as well as a recognition of the benefits that organic farming brings both at the farm level and in the environment [7].

Organic farming is a production system that combines respect for soil, ecosystems and people with innovation and scientific research [20]. It aims to promote fair relations and a better quality of life for all those involved in the agri-food chain: farmers, processors, distributors, traders and consumers [2]. From a socio-economic perspective, organic farming, being labor-intensive, supports rural employment and community growth. Organic products typically fetch higher market prices, potentially improving farmers' livelihoods.

The debate on organic farming's role in food security continues, yet despite typically lower yields, its resilience to environmental stressors and contribution to dietary diversity are noteworthy [7]. This approach has encouraged many farmers to transform part of their land into organic farming areas, a fact reflected by the accelerated growth of organically cultivated areas in recent years in Romania [8].

In order to establish a sustainable agricultural future, it becomes imperative to integrate the key advantage of conventional farming, which is high productivity, with the benefits of ecological agriculture, particularly the reduced reliance on chemical substances. By merging these two approaches, we can achieve a harmonious balance that combines efficient agricultural production with environmentally-friendly practices. This integration holds the potential to address the growing concerns associated with

conventional farming methods, such as the excessive use of pesticides and fertilizers, and their negative impacts on ecosystems and human health. By incorporating the best aspects of both systems, we can pave the way for a more sustainable and ecologically-responsible approach to agriculture [10].

## MATERIALS AND METHODS

As research methods we used documentation, analysis and data processing. These methods are based on processes of synthesis, analogy and comparative analysis. Once the information was defined, known and interpreted, the next step was to document the area of interest in detail.

The data used in this study were provided by Eurostat. In the analysis activity, the study and documentation for the domain or for the analyzed system is a starting point. They allow analysis to obtain the first knowledge and information.

## RESULTS AND DISCUSSIONS

In general, the area cultivated in the organic system has increased significantly in recent years, a trend observed worldwide [20]. In Europe, for example, the area of land devoted to organic farming has increased steadily over the last decade, although the rate of increase has varied by country and crop [5].

In contrast, the area under conventional cultivation has remained relatively stable or decreased in some regions, in part due to the shift to more sustainable farming methods [6]. Considerable variations exist depending on the type of crop cultivated. For instance, when analyzing cereals, a notable trend emerged, indicating a more rapid expansion of cultivated areas within the organic farming system as opposed to the conventional system [16]. In contrast, for some crops such as soy, the trend was the opposite, with a faster expansion of the areas cultivated in the conventional system [1].

In the last decade, between 2012 and 2021, there has been a considerable increase in organically cultivated areas in most European countries. Despite the differences in organic

and conventional farming, we see a constant upward trend in organic farming. This may reflect an increase in awareness and concern for the environment, as well as a growing demand for organic agricultural products.

Between 2012 and 2021, organic farming has seen significant growth in several European countries, reflecting the growing interest in sustainable agricultural practices and respect for the environment [9]. Romania stands out in this context, registering a positive evolution in organic agriculture.

In 2012, the area cultivated organically in Romania was 288,261 hectares, and in 2021 this increased to 578,718 hectares, reflecting a significant increase of approximately 101% in a span of just nine years. This shows a growing interest of Romanian farmers for ecological agriculture and the adoption of sustainable practices in the field [19]. This growth is encouraging and indicates a strong transition towards a more sustainable agricultural system in the country (Table 1).

Table 1. Total area converted and under conversion to organic farming at EU level – 2021 vs 2012

	2012	2021
France	1,030,881	2,775,671
Spain	1,756,548	2,635,442
Italy	1,167,362	2,186,159
Germany	959,832	1,601,316
Portugal	200,833	768,800
Austria	533,230	700,392
Sweden	477,684	606,669
Romania	288,261	578,718
Greece	462,618	550,668
Poland	655,499	549,443
Czechia	468,670	548,792
Finland	197,751	365,379
Denmark	194,706	303,093
Latvia	195,658	302,177
Hungary	130,607	293,597
Lithuania	156,539	261,782
Estonia	142,065	226,605
Slovakia	164,360	162,565
Croatia	31,904	121,924
Belgium	59,718	102,413
Ireland	52,793	86,868
Bulgaria	39,138	86,310
Netherlands	48,038	76,375
Slovenia	35,101	51,826
Cyprus	3,923	7,738
Luxembourg	4,130	6,893
Malta	37	66

Source: Eurostat, 2023 [5].

In terms of other European countries, France is at the top of the ranking, with an impressive increase in organically cultivated areas. In 2012, the extent of land devoted to organic farming in France amounted to 1,030,881 hectares, which subsequently experienced a substantial rise to 2,775,671 hectares by 2021. This noteworthy expansion demonstrates the resolute dedication of French farmers towards organic farming practices and the adoption of sustainable approaches. Similarly, Spain ranks among the leading countries witnessing significant growth in organically cultivated areas. In 2012, Spain recorded 1,756,548 hectares dedicated to organic farming, and by 2021, this figure escalated to 2,635,442 hectares.

Italy has also seen a significant increase in organically cultivated areas.

In 2012, Italy had 1,167,362 hectares dedicated to organic farming, and in 2021 this increased to 2,186,159 hectares.

Germany and Portugal are also among the countries that have seen a significant increase in organically cultivated areas. Germany went from 959,832 hectares in 2012 to 1,601,316 hectares in 2021, while Portugal increased from 200,833 hectares in 2012 to 768,800 hectares in 2021.

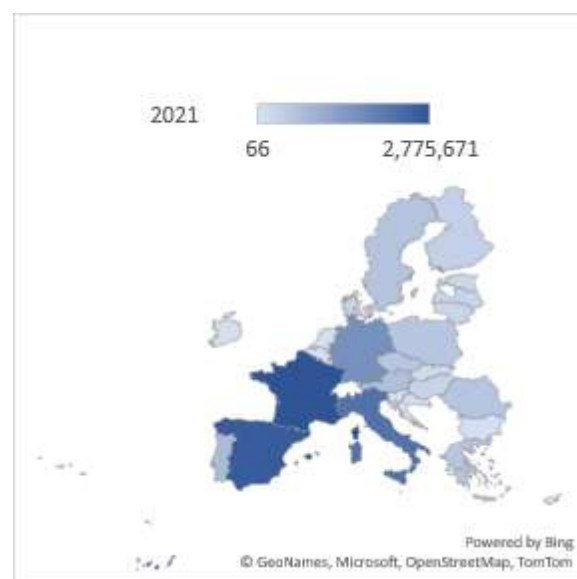


Fig. 1. Ecological crop area converted and under conversion, 2021

Source: Own representation based on Eurostat data, 2023 [5].

These figures highlight the fact that organic farming is gaining more and more ground in Europe, and the countries mentioned are at the forefront of this trend. The shift to ecological agricultural practices is evidence of increased awareness and concern for the environment and human health (Figure 1). From another perspective, we can analyze the data on the share of land completely converted and those in the process of conversion to organic agriculture in the period 2012-2021 through the perspective of the percentage evolution and the ranking of the countries.

The hierarchy among key players in organic farming has remained consistent over time, with France, Spain, and Italy consistently occupying the top three positions in terms of the proportion of converted land to organic farming in 2021. France retains its leading position with a share of 17.62% of converted land in 2021, followed by Spain with a share of 16.73% and Italy with a share of 13.88%. These countries serve as exemplary models of success in promoting organic farming and implementing sustainable practices within the agricultural sector. Germany and Portugal rank closely behind, accounting for 10.16%

and 4.88% of the converted land respectively in 2021. These countries have also experienced notable increases in recent years, indicating a growing interest in organic farming practices.

Romania is 8th in the ranking, with a share of 3.67% of land converted in 2021. Although the share is lower compared to France, Spain and Italy, Romania has seen significant growth in recent years, with an increase of 200.76% in the analyzed period. This indicates a growing interest of Romanian farmers for ecological agriculture and the adoption of sustainable practices.

Other countries such as Greece, Poland, the Czech Republic, Finland and Denmark are in the 3% to 2% weight range, reflecting their commitment to organic farming.

It is important to note that the share of land converted to organic farming should not only be analyzed in absolute numbers, but also in the context of the size and agricultural structure of each country.

The share may be influenced by factors such as the size of the total agricultural areas, the existing agricultural structure and the agricultural policy adopted by each country.

Table 2. Total area converted and under conversion to organic farming at EU level

	2012	2015	2020	2021	2021/2012	2021%
<b>UE27</b>	9,457,886	10,609,926	14,724,279	15,754,979	166.58	100
<b>France</b>	1,030,881	1,322,911	2,517,478	2,775,671	269.25	17.62
<b>Spain</b>	1,756,548	1,968,570	2,437,891	2,635,442	150.04	16.73
<b>Italy</b>	1,167,362	1,492,571	2,094,592	2,186,159	187.27	13.88
<b>Germany</b>	959,832	1,060,291	1,590,962	1,601,316	166.83	10.16
<b>Portugal</b>	200,833	241,375	319,540	768,800	382.81	4.88
<b>Austria</b>	533,230	552,141	679,992	700,392	131.35	4.45
<b>Sweden</b>	477,684	518,983	610,543	606,669	127.00	3.85
<b>Romania</b>	288,261	245,924	468,887	578,718	200.76	3.67
<b>Greece</b>	462,618	407,069	534,629	550,668	119.03	3.50
<b>Poland</b>	655,499	580,731	509,286	549,443	83.82	3.49
<b>Czechia</b>	468,670	478,033	540,375	548,792	117.10	3.48
<b>Finland</b>	197,751	225,235	316,248	365,379	184.77	2.32
<b>Denmark</b>	194,706	166,788	299,998	303,093	155.67	1.92
<b>Latvia</b>	195,658	231,608	291,150	302,177	154.44	1.92
<b>Hungary</b>	130,607	129,735	301,430	293,597	224.79	1.86
<b>Lithuania</b>	156,539	213,579	235,471	261,782	167.23	1.66
<b>Estonia</b>	142,065	155,806	220,796	226,605	159.51	1.44
<b>Slovakia</b>	164,360	181,882	222,896	162,565	98.91	1.03
<b>Croatia</b>	31,904	75,883	108,610	121,924	382.16	0.77
<b>Belgium</b>	59,718	68,818	99,072	102,413	171.49	0.65
<b>Ireland</b>	52,793	73,037	74,666	86,868	164.54	0.55
<b>Bulgaria</b>	39,138	118,552	116,253	86,310	220.53	0.55
<b>Netherlands</b>	48,038	49,273	71,607	76,375	158.99	0.48
<b>Slovenia</b>	35,101	42,188	49,803	51,826	147.65	0.33
<b>Cyprus</b>	3,923	4,699	5,918	7,738	197.25	0.05
<b>Luxembourg</b>	4,130	4,216	6,118	6,893	166.90	0.04
<b>Malta</b>	37	30	67	66	178.38	0.00

Source: Eurostat, 2023 [5].

Thus, analyzing the data on the share of completely converted lands and those in the process of conversion to organic agriculture from another perspective, we can observe the ranking of the main players in the field and their percentage evolution in the period 2012-2021.

France, Spain and Italy remain at the top of the ranking, while Romania registers a significant increase and is in 8th place (Table 2).

Returning to Romania's situation, between the years 2012 and 2021, a significant increase in the total area dedicated to organic agriculture is observed, from 288,261 hectares in 2012 to 578,718 hectares in 2021, representing an increase of approximately 101% in a span of only nine years.

The data regarding land fully transitioned to organic farming demonstrates consistent and

substantial expansion. In 2012, the total area amounted to 103,093 hectares, and by 2021, it had surged to 344,541 hectares, marking a remarkable growth rate of over 234%. This sustained increase underscores a resolute and sustainable dedication to organic farming practices. However, when considering land in the process of conversion, the figures display varying fluctuations over the years.

In 2012, the area was 185,168 hectares, it reached a minimum level in 2016, with 76,696 hectares, and in 2021 it reached 234,177 hectares.

Overall, the data reflect an upward trend of organic farming in Romania, with a considerable increase in the areas cultivated in this way, both in terms of fully converted lands and those in the process of conversion (Figure 2).

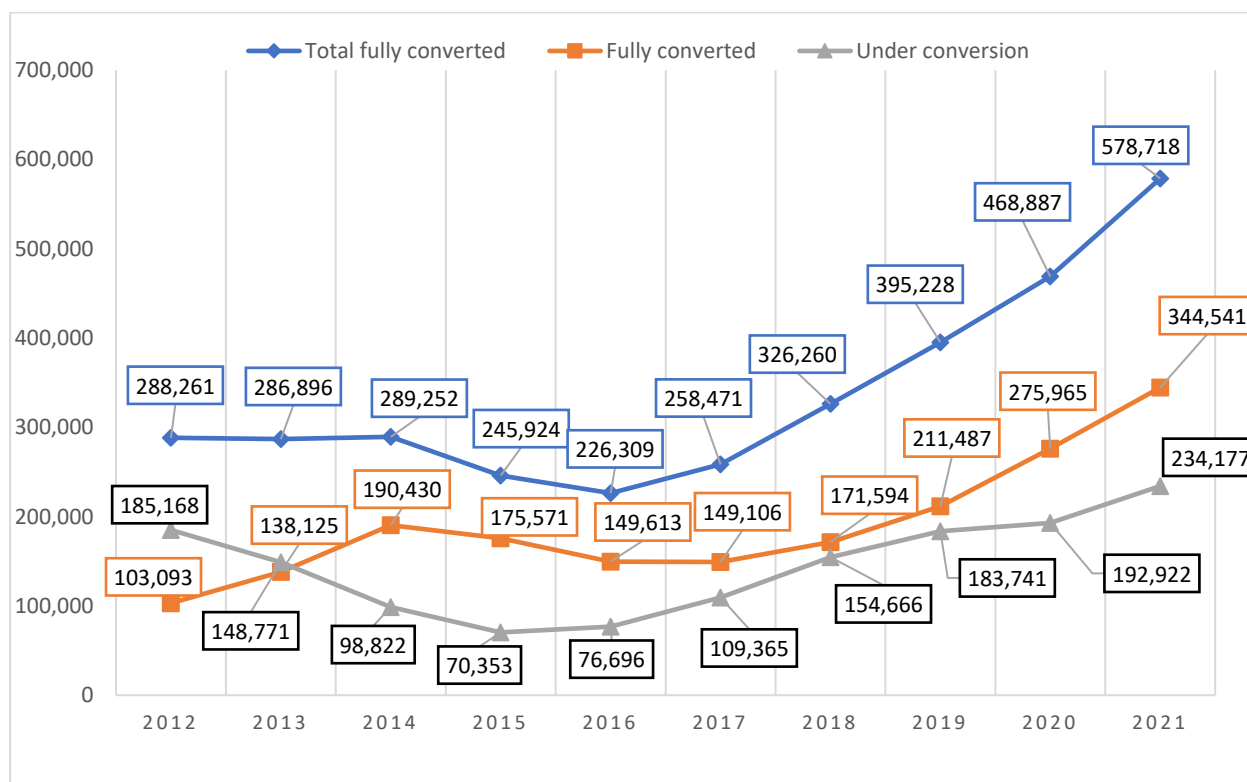


Fig. 2. The evolution of the area cultivated in the ecological system at the level of Romania  
 Source: Own representation based on Eurostat data, 2023 [5].

While Romania had an increase of almost 101% (from 288,261 ha in 2012 to 578,718 ha in 2021), the total area of organic agriculture in the EU increased by about 56% (from 9,457,886 ha in 2012 to 14,724,279 ha in

2019, this being the last year for which we have data).

The data suggest that Romania had a faster growth rate than the EU average in the expansion of organic farming. However, it is important to note that, in absolute terms, the

area dedicated to organic farming in Romania remains much smaller compared to the EU total.

## CONCLUSIONS

Organic farming is a critical shift in agricultural methods, offering a pathway towards a more sustainable future with profound impacts on health, environment, and socio-economy.

Its health benefits are notable as it limits the use of harmful synthetic pesticides and fertilizers, often resulting in produce with higher nutritional value and less heavy metals compared to conventionally grown food.

Environmentally, organic farming can mitigate degradation by boosting soil fertility, preserving biodiversity, safeguarding water quality, and reducing greenhouse gas emissions. It also leverages nature for pest and nutrient management, thus enhancing agricultural resilience against climate change.

In sum, organic farming, while addressing many challenges of conventional practices, provides a sustainable, health-conscious, and biodiversity-friendly approach to feeding the expanding global population.

Organic farming has emerged as an increasingly preferred and necessary alternative, owing to the adverse effects of conventional agriculture on the environment and health. This study focused on analyzing the evolution of organic farming in Romania and identified trends at the European level.

We discovered that there has been a significant expansion in the areas cultivated under organic farming in recent years. This growth is evident at both national and European levels. Romania, in particular, has witnessed a swift increase in areas dedicated to organic farming, notably in fully converted lands. Despite this progress, however, the overall land area dedicated to organic agriculture in Romania remains relatively minor when compared to other European nations.

This study further accentuates that the proportion of land converted to organic farming should be scrutinized within the context of each country's size and agricultural

structure. The hierarchy of leading nations in organic farming remains stable, with France, Spain, and Italy leading the pack in terms of land area converted to organic farming.

The implications of these findings necessitate the persistent promotion of organic farming and the embrace of sustainable practices in agriculture. This doesn't imply discarding conventional agriculture entirely, which is often more productive, but rather supplementing it with organic farming's benefits, such as lesser dependence on chemical substances. This integration could offer a plausible solution to achieving equilibrium between fulfilling food requirements and protecting the environment.

In conclusion, it's clear that organic farming is gradually gaining a firmer foothold in Europe. The rising interest and adoption of sustainable agricultural practices denote a significant stride toward a more sustainable, eco-friendly agricultural system. This study underscores the importance of this transition and reiterates the need for ongoing research in this field to guarantee a healthy and sustainable agricultural future. We need to reconcile the global need for food security with environmental sustainability, and organic farming in Romania and across Europe shows promising potential to help us achieve this balance.

## REFERENCES

- [1]Connor, D. J., Mínguez, M. I., 2012, Evolution not revolution of farming systems will best feed and green the world, *Global Food Security*, Vol. 1(2), 106-113.
- [2]Darnhofer, I., Bellon, S., Dedieu, B., Milestad, R., 2010, Adaptiveness to enhance the sustainability of farming systems. A review, *Agronomy for Sustainable Development*, Vol. 30(3), 545-555.
- [3]Dumitru, E. A., Marius Mihai, M. I. C. U., Tudor, V. C., 2019, Conceptual Approaches Regarding The Romanian Rural Area. *Landscape*, 19(2).
- [4]Dumitru, E.A., Ursu, A., Tudor, V.C., Micu, M.M., 2021, Sustainable Development of the Rural Areas from Romania: Development of a Digital Tool to Generate Adapted Solutions atLocal Level, *Sustainability*, 13,11921
- [5]Eurostat., 2020, Organic farming statistics, [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic\\_farming\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics), Accessed on April, 10, 2023.

- [6]FAO, 2020, The state of the world's land and water resources for food and agriculture (SOLAW) - Managing systems at risk, <http://www.fao.org/3/i1688e/i1688e.pdf>, Accessed on April, 10, 2023.
- [7]Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., ... & Helenius, J., 2003, Agroecology: The ecology of food systems. *Journal of Sustainable Agriculture*, Vol. 22(3), 99-118.
- [8]Jurjescu, A.L., Peev-Otiman, P.D., Adamov, T., Mateoc-Sîrb, N., 2021, The evolution of organic agriculture in Romania, *Agricultural Management, Lucrări Științifice, seria I, Vol. XXIII (3)*, 52-56.
- [9]Mărcuță, L., Mărcuță, A., Mărza, B., 2014, Modern tendencies in changing the consumers' preferences, *Procedia Economics and Finance*, 16, 535-539.
- [10]Popescu, A., 2015, Research on the distribution and concentration of the farms cultivating maize for grains in Romania using the Gini Coefficient, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol.15(3), 261-264.
- [11]Popescu, A., Stanciu, M., Stanciu, C., 2023, Romania's vegetal production in the post access period to the European Union. *Scientific Papers Series Management, Economic Engineering in Agriculture & Rural Development*, 23(1), 627-638.
- [12]Popescu, A., Tindeche, C., Marcuța, A., Marcuța, L., Hontus, A., 2022, Cereals production between climate change and price boom in Romania, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol.22(4), 579- 594.
- [13]Pretty, J., Toulmin, C., Williams, S., 2011, Sustainable intensification in African agriculture, *International journal of agricultural sustainability*, 9(1), 5-24.
- [14]Reganold, J. P., Wachter, J. M., 2016, Organic agriculture in the twenty-first century, *Nature plants*, 2(2), 1-8.
- [15]Seufert, V., Ramankutty, N., Foley, J. A., 2012, Comparing the yields of organic and conventional agriculture. *Nature*, 485(7397), 229-232.
- [16]Seufert, V., Ramankutty, N., Foley, J. A., 2012, Comparing the yields of organic and conventional agriculture. *Nature*, 485(7397), 229-232.
- [17]Tilman, D., Balzer, C., Hill, J., Befort, B. L., 2011, Global food demand and the sustainable intensification of agriculture, *Proceedings of the national academy of sciences*, 108(50), 20260-20264.
- [18]Tudor, V. C., Dinu, T. A., Vladu, M., Smedescu, D., Vlad, I. M., Dumitru, E. A., ... Costuleanu, C. L., 2022, Labour implications on agricultural production in Romania, *Sustainability*, Vol.14(14), 8549.
- [19]Tudor, V. C., Gimbașanu, G. F., Fintîneru, A., Mărcuță, A. G., Coadă, C. S., Teodorescu, R. F., 2022, Comparative study on the level of production costs in organic and conventional agriculture in Romania, *Scientific Papers Series Management, Economic Engineering in Agriculture & Rural Development*, Vol. 22(2), 761-766.
- [20]Willer, H., Lernoud, J., 2020, The world of organic agriculture, *Statistics and emerging trends 2020*, FiBL and IFOAM – Organics International.

