Scientific Papers. Series B, Horticulture. Vol. LXIX, No. 2, 2025
Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653

VEGETABLE MARKET EVOLUTION IN THE PERIOD 2009-2023 ORGANIC & CONVENTIONAL

Iulian Andrei SZEIKELY, Valerica TUDOR*, Laurenţiu Cătălin BOROIU, Răzvan Ionuţ TEODORESCU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, Bucharest, Romania

Corresponding author email: valericatudor@gmail.com

Abstract

Organic agriculture has experienced an accelerated development in recent decades in response to growing concerns about public health, food safety and environmental protection. Organic farming provides consumers with healthy food uncontaminated with toxic residues. The main objective of the present work was to investigate the evolution of organic & conventional vegetable farming at World, EU and Romanian levels over a period of fifteen years (2009-2023), in terms of cultivated areas, production, vegetable market analysis, situation of organizations and evolution of the certification process in vegetable crops (Romania), in a global context marked by the growth of this sector. Romania has a high potential in organic vegetable growing, but faces small areas, modest production and high dependence on imports.

Key words*: organic agriculture, trends, surfaces, producers, organic market.*

INTRODUCTION

Organic agriculture, unlike conventional agriculture, aims to preserve and even improve consumers' health along with the unaltered preservation of the environment by using friendly technologies, which preserve soil fertility, biodiversity and also minimize global environmental problems (Szeikely et al., 2024; Bonciu, 2022; Paull, 2023; Ioviță et al., 2024; Avasiloaiei et al., 2023).

In every region of the globe, organic agriculture action plans aim to develop the sector through increased production, demand and sustainability (Paull, 2023; Willer et al., 2021; Oshunsanya & Aliku, 2016; Fernandez-Cornejo et al., 1998).

Globally, but especially in Europe, a strong demand has emerged for obtaining agri-food products using clean technologies.

The organic sector has started to develop rapidly in the world, with consumers showing a real interest in reducing the risks that agricultural practices could cause to human health and the environment (Silva Dias, 2011).

Farmers in organic agriculture have as their main objective to produce, through environmentally friendly agricultural practices, high quality food with outstanding nutritional value and, above all, free from any health hazards for consumers (Fernandez-Cornejo et al., 1998).

The extent of organically managed agricultural land, the number of organic farms and the size of the global market for organically grown food have steadily increased (Willer et al 2017, 2021; Fawzy et al., 2016).

The expansion of organic production has involved producing nutritionally improved food crops while using fewer external inputs and reducing environmental impacts (Risku-Norja and Mäenpää, 2017).

In a 2022 study, organic farmland reached 72.3 million hectares (1.5% of all farmland), being managed organically by at least 2.7 million farmers in 187 countries. According to the study, the countries with the largest areas of organic land were: Australia (35.7 million hectares), Argentina (3.67 million hectares), Spain (2.35 million hectares), USA (2.33 million hectares) and India (2.30 million hectares), and the distribution of organic farmland by continent was: Oceania (50%), Europe (23%), Latin America (12%), Asia (8%), North America (5%) and Africa (3%) (Fernández et al., 2022; Paull J., 2023).

In the European Union, the Farm to Fork and Biodiversity strategies propose ambitious actions and commitments to combat biodiversity

decline, to transform food systems into global standards for competitive sustainability, the protection of human health and the environment, and to ensure livelihoods for all actors in the food value chain. A target has thus been set that by 2030, 25% of the EU's agricultural area should be used for organic farming (MADR, 2025). As technologies continue to permeate farming practices and the food chain, further exclusions can be anticipated to ensure that organic food is food, 'pure and simple', is what consumers would consider 'natural' and is food without the incursion of technopollutants and contaminants (Paull, 2023).

Organic is now an important aspect of consumers' food choices. The majority of consumers (72%) report buying organic foods "regularly" or "sometimes" according to a survey of 21,261 consumers in 38 countries (Nielson, 2005).

In this context, organic vegetables are an important component of the global agri-food system.

Organic farming systems differ fundamentally from conventional ones in their primary focus on management practices that promote and enhance ecological harmony (Tudor et al., 2024). In contrast to conventional marketing practices, almost half of the organic growers surveyed and the majority of the small organic growers market their vegetables directly to consumers through farmers' markets and other direct marketing channels (Brumă et al., 2023).

Certification of organic production provides certainty to consumers and recognition to farmers. It allows decoupling the relationship between producers and consumers as it preserves the organic identity and portability of these products differentiated in time and space. Certification paves the way for extending the supply chain, facilitates the supply of organic products to consumers at a geographical distance, not just within the country's borders, and also facilitates international exports.

Organic certification is a mechanism to monetize organic production by allowing product differentiation on the market. Certification maintains a price premium along the supply chain by preserving the organic identity of the product (PAN-UK, 2017).

With certification came logos and standards, the development of export opportunities and, over time, the mutual recognition of national certifications and standards, and eventually statistics and quantification of the organic phenomenon.

Although organic standards are specific to certification bodies, and certification bodies are usually local or national, there is a general harmony and congruence in the multitude of individual standards.

Certification favors large producers who distribute products widely. Organic certification favors large producers who distribute widely, while it disadvantages small producers with short supply chains, as certification costs can be discouraging or even prohibitive.

MATERIALS AND METHODS

The main objective of the present work was to investigate the evolution of organic vegetable farming at the World, European Union and Romanian levels over a fifteen-year period (2009-2023), in terms of cultivated areas, production, vegetable market analysis, situation of organizations and evolution of the certification process in vegetable crops, in a global context marked by the growth of this sector.

In this context, we resorted to a set of methods including documentation (analysis of scientific literature focused on this topic, at national, European and international level), data analysis of literature data, analysis and processing of data series from official national sources (Romanian Ministry of Agriculture and Rural Development, National Institute of Statistics - INS) and from international sources (FAO (FAOSTAT), EUROSTAT, FiBL (Research Institute of Organic Agriculture), IFOAM (International Federation for Organic Agriculture Movements), comparative analysis, synthesis and evolution of indicators over the mentioned time interval, and the results are illustrated in tabular form.

RESULTS AND DISCUSSIONS

The area planted to vegetables in the EU decreased significantly by more than 70% in 2023 compared to 2000, the main reasons including: fragmentation of vegetable land and small farm sizes, high and increasingly

expensive production costs (seeds, fertilizers, pesticides). The land cultivated with vegetables worldwide, both in conventional and organic systems, increased progressively over the period 2009-2023, with the areas cultivated in organic systems showing oscillating increases between 49757 thousand ha (2009) and 59132 thousand ha (2023) (Table 1). Within the EU, the organic farming system registers a significantly higher ratio of 7.7% (average 2009-2023), with 38.2% representing the EU/Global organic system ratio. In Romania, the areas cultivated with conventionally grown vegetables are decreasing, from 238 thousand ha (2009) to 90 thousand ha (2023). Although the areas cultivated in the organic system represent 1% of the conventional system, a slight increase can be observed in the last 3 years (2021, 2022, 2023), showing an increased interest in organic vegetable growing.

Analyzing the data in Table 1, a slightly increasing ratio of the area cultivated in the conventional system in Romania compared to the EU can be highlighted.

Table 1. Evolution of areas cultivated with vegetables, organic & conventional (thousand ha) (2009-2023)

Year	Worldwide		European Union		Romania	
	Conventional (thousand ha)	Organic (thousand ha)	Conventional (thousand ha)	Organic (thousand ha)	Conventional (thousand ha)	Organic (thousand ha)
2009	49757	219.3	2253	77.29	238	0.33
2010	51267	235	2162	81.52	236	0.73
2011	52355	250.52	2133	104.79	237	0.91
2012	53603	238.56	2037	77.99	232	0.89
2013	54549	293.18	2010	88.54	234	0.73
2014	55257	298.47	2035	97.4	219	1.91
2015	57029	318.99	2055	102.18	218	1.19
2016	56311	384.16	2105	129.51	208	1.16
2017	56800	379.84	2093	160.68	206	1.44
2018	56646	399.74	1671	181.18	117	0.97
2019	57163	430.72	1688	181.29	120	0.77
2020	57687	427.39	1697	195.4	98	0.83
2021	58263	475.97	1734	213.64	99	1.04
2022	58787	516.6	1590	213.32	88	1.04
2023	59132	551.93	1587	208.95	90	1.04
Average	**55,640.4**	**361.4**	**1,923.3**	**140.9**	**176.0**	**1.0**

Source: Own calculation based on the data from https://www.fao.org/faostat

Vegetable production generally requires a higher capital infusion than cereal crops and is often riskier as yields and prices are more variable. At world level, vegetable production increased by more than 70% in 2023 compared to 2009. At EU level, production is slightly fluctuating, with an average of 57,808.8 thousand tonnes (minimum 51672 thousand tons in 2023 and maximum 62,362 thousand tons in 2009). However, Romania shows a downward trend after 2015, dropping from over 3,200 thousand tons to below 1,200 thousand tons in 2023 (Table 2). This reduction can be correlated with the decrease in cultivated areas and with climatic, economic and technological factors.

Table 2. Evolution of vegetable production in the conventional system (million tons) (2009-2023)

Year	Worldwide	European Union	Romania
	(thousand tons)	(thousand tons)	(thousand tons)
2009	917654	62362	3259
2010	940817	59089	3214
2011	976623	60402	3546
2012	1002238	58366	2997
2013	1024323	57101	3344
2014	1059647	60092	3288
2015	1088202	59933	3184
2016	1091033	62355	2898
2017	1107210	62154	3102
2018	1108625	52636	2026
2019	1126758	54525	1853
2020	1144096	55867	1949
2021	1160501	58731	1939
2022	1171283	51847	1258
2023	1186682	51672	1199
Average	**1073713**	**57808.8**	**2603.7**

Source: Own calculation based on the data from https://www.fao.org/faostat

The global vegetable industry is now in a period of transition from increasing quantity to increasing quality and efficiency.
The vegetable grower needs to become more knowledgeable about vegetable crop production and adopt more convenient management techniques and cultural practices, such as irrigation and fertigation, protected cultivation and transplanting technology, and the use of better hybrid vegetable varieties.
Competition from imported vegetables from countries such as Turkey, Poland or the Netherlands, which are often cheaper than locally produced ones, is also a limiting factor.
Imports of vegetables (thousand tons) in the analyzed period (2009-2023), show an upward trend, with an average of 61956.5 thousand tons at world level, 21737.9 thousand tons in the EU and only 474 thousand tons in Romania, which represents an average of only 2.1 thousand tons compared to the EU (Table 3).
The export market (thousand tons) also has an upward trend, with a minimum ratio of 40 thousand tons between the EU and the quantities of vegetables exported worldwide (Table 3).
In Romania, the evolution of exports is upward starting from 41 thousand tons in 2009 and 104 thousand tons in 2022, with important fluctuations between years (Table 3).

Table 3. Evolution of imports and exports of vegetables in the conventional system (thousand tons) (2009-2023)

Year	Imports			Exports		
	Worldwide	European Union	Romania	Worldwide	European Union	Romania
	(thousand tons)	(thousand tons)	(thousand tons)	(thousand tons)	(thousand tons)	(thousand tons)
2009	48108	18392	254	50242	20747	41
2010	51442	18846	314	53382	21718	53
2011	53080	19490	313	55518	22957	57
2012	54023	19587	298	55383	23356	50
2013	56414	19905	307	58002	24091	61
2014	58817	20335	357	61649	24992	57
2015	60110	21076	414	61430	25096	57
2016	62508	21602	491	64308	25615	40
2017	63631	22431	512	66415	26926	51
2018	66603	23188	605	69163	27475	50
2019	68676	23736	611	70818	28016	49
2020	70282	23768	622	73649	28401	71
2021	70901	24296	652	74753	28360	78
2022	71975	24551	670	75342	28610	104
2023	72778	24865	693	74151	27206	99
Average	**61956.5**	**21737.9**	**474.2**	**64280.3**	**25571.1**	**61.2**

Source: Own calculation based on the data from https://www.fao.org/faostat

As global health awareness increases and household incomes rise, an increasing global demand for vegetables is expected.
As vegetable producers are typically better integrated into markets than field crop producers, vegetable crop production contributes to the commercialization of the entire rural economy, which is characterized by increased marketing and trade.
Studies show that the commercialization of vegetables stimulates and benefits the rural economy and contributes to the process of growth and development by generating employment and increasing agricultural productivity and secondary industries.
The value of exports and imports is directly proportional to production (thousand tons) (Table 4).
Table 4 shows that Romania imported vegetables worth 501.3 million USD (average 2009-2023), ranging from 217.1 million USD in 2009 to 993.4 million USD in 2023, with a difference of more than 25% between the value of imports and exports (Table 4).

Table 4. Evolution in value of imports and exports of vegetables in the conventional system (Million USD) (2009-2023)

Year	Imports			Exports		
	World	European Union	Romania	Worldwide	European Union	Romania
	(thousand USD)	(thousand USD)	(thousand USD)	(thousand USD)	(thousand USD)	(thousand USD)
2009	52922.3	24336.3	217.1	52748.2	27015.2	59.2
2010	59471.1	25689.9	239.5	59781.4	28952.5	86.6
2011	63753.5	26779.9	232.3	63851.1	29841.4	78.6
2012	62789.6	25999	236	62190.2	29856.4	75.8
2013	69883.1	28056.6	289.5	69087	32402.9	108.8
2014	71771.5	28641.8	361.8	73291.5	32741.3	130.1
2015	69779.1	26464	380	70199.4	29390.2	112.8
2016	73062.5	27942.7	472.2	74531.8	30783.7	95.4
2017	77535.2	30860.2	532.2	80097.7	33607.8	120
2018	80173.7	32165	634.3	83093	35551.6	140.5
2019	82434.9	32401.8	670.5	84242.1	35469	127.2
2020	87068.4	34577.2	692.5	87938.9	37830.1	151.7
2021	92948.2	37484.8	768.7	94292.8	41014.9	187.1
2022	98235.1	37861.9	800.2	97436.4	41052.7	221.8
2023	107018.9	44312.5	993.4	105847	46844.8	227.2
Average	**76589.8**	**30904.9**	**501.3**	**77241.9**	**34157.0**	**128.2**

Source: Own calculation based on the data from https://www.fao.org/faostat

We can conclude that globally and in European Uunion, imports and exports in the conventional system have increased both in volume (thousand tons) and value (million USD), reflecting an intensification of international trade in vegetables. In Romania, imports increased significantly, exceeding exports in volume and value, indicating a negative trade balance in this sector. Competitive participation in international markets requires relatively sophisticated marketing, information and transport networks as well as improved varieties, quality control, product standardization and, for some future markets, traceability. Other necessary improvements include pre- and post-harvest processing technologies, as well as market information systems including prices, seasonality information, post-harvest handling constraints and technological opportunities.

More than 2.7 million organic producers were reported worldwide, compared to 0.3 million in the European Union and only 0.01 million in Romania (average 2009-2023), which shows that Romania has a marginal share in the organic production sector at European and global level. This situation can be explained by a number of structural and conjunctural factors, such as the low level of information and training of farmers, insufficient specific financial support, the lack of well-established value chains, limited access to competitive outlets, and administrative and certification barriers (Table 5).

Table 5. Evolution of the number of organic producers, processors, importers and exporters (2009-2023)

Year	Organic producers (no.)			Organic processors (no.)			Organic importers (no.)			Organic exporters (no.)		
	Worldwide	EU	Romania	Worldwide	EU	Romania	Worldwide	EU	Romania	Worldwide	EU	Romania
2009	1806927	204417	3078	40707	31785	70	3023	2635	16	4157	10	0
2010	1564348	215472	2986	40070	31945	88	3147	2761	13	943	17	0
2011	1769447	231359	9471	44466	35201	106	9630	2913	2	3367	132	0
2012	1912045	249100	15315	49410	39416	105	3558	3020	3	2247	296	3
2013	1957379	252514	14901	53607	42862	100	3568	3015	1	2306	256	1
2014	2067063	252746	14159	62374	47890	124	3714	3065	3	4395	872	1
2015	2237937	265677	11869	68875	52178	142	4250	3510	6	6129	1957	2
2016	2544463	291721	10083	78428	57202	150	5279	3941	5	6338	2059	5
2017	2928406	302131	7908	86095	63384	161	6067	4504	9	7580	2676	6
2018	2784088	321772	7908	95216	69368	175	6571	5016	18	8678	3152	6
2019	3146851	338212	9277	100096	74866	191	7333	5559	24	8448	3130	15
2020	3494939	349509	9647	105072	77893	201	7783	5878	30	10007	3614	27
2021	3593062	384968	11562	113546	84452	209	8885	6642	34	11199	4126	25
2022	4514169	426688	12598	136813	87436	203	8483	6505	25	8426	4296	25
2023	4332499	434577	12598	133286	89379	203	10426	6727	25	9201	4898	25
Average	**2710241.5**	**301390.9**	**10224**	**80537.4**	**59017.1**	**148.5**	**6114.5**	**4379.4**	**14.3**	**6228.1**	**2099.4**	**9.4**

Source: Own calculation based on the data from: https://statistics.fibl.org

While data on organic producers are available for almost all countries, this is not the case for processors and importers, let alone exporters. Although data availability is improving, it is not yet possible to draw a clear picture to substantiate qualitative assessments and economic analysis, but only to present a punctual situation and a forecast of the situation for Romania. According to the data presented in Table 5, in 2023 the number of organic producers in Romania was 12598. In order to obtain and maintain the certification of organic production, each operator in organic farming undergoes a complete assessment of the activity, according to the inspection and certification contract concluded with the inspection body.

There are 15 control bodies (CBs) in the field of organic farming operating in Romania, approved by MADR on the basis of Articles 2-6 of MADR Order No 312/2021. On 11.07.2025, MADR published on its own website, the List of recognized producer groups with the following groups of products for which it obtained recognition: cereals, oilseeds, legumes, fodder, medicinal and aromatic plants, sugar beet, fruit and vegetables, potatoes, fruit and vegetables for processing, milk and dairy products, pig meat, beef, sheep, goat, poultry meat and eggs, propagation material (seeds, seedlings, cuttings, stolons, saplings, scions/grafts, rootstocks, etc.), wood, tobacco, honey and bee products, etc.

In terms of the structure of organic production and its share in total agricultural production, it can be observed that the highest share in organic production is held by cereals, oilseeds and fodder. The data show a geographical concentration of certifications in a few counties (Bihor, Arad, Constanța, Tulcea, Suceava), suggesting the existence of regional centers active in organic production (Table 6).

Table 6. Evolution of certifications for organic producer groups & organic vegetable producers in Romania, 2006-2025

COUNTY	Organic system		Organic vegetables	
	Recognition decisions (no)	Withdrawal decisions (no)	Recognition decisions (no)	Withdrawal decisions (no)
ALBA	7	6	0	0
ARAD	19	5	4	2
ARGEȘ	9	3	0	0
BACĂU	4	1	0	0
BIHOR	34	16	3	1
BISTRIȚA- NĂSĂUD	7	5	0	0
BOTOȘANI	5	2	0	0
BRAȘOV	7	3	4	1
BRĂILA	11	1	1	0
BUZĂU	18	4	1	1
CARAȘ SEVERIN	0	0	0	0
CĂLĂRAȘI	24	2	3	0
CLUJ	9	3	2	0
CONSTANȚA	16	4	8	2
COVASNA	22	6	1	0
DÂMBOVIȚA	10	6	6	5
DOLJ	5	3	3	3
GALAȚI	15	7	8	7
GIURGIU	8	0	4	0
GORJ	0	0	0	0
HARGHITA	8	1	1	0
HUNEDOARA	5	0	3	0
IALOMIȚA	13	5	3	2
IAȘI	6	2	1	0
MARAMUREȘ	7	5	4	3
MEHEDINȚI	2	1	0	0
MUREȘ	10	2	2	0
NEAMȚ	7	5	0	0
OLT	3	1	2	2
PRAHOVA	10	7	6	5
SATU MARE	15	4	1	1
SĂLAJ	7	2	0	0
SIBIU	5	1	0	0
SUCEAVA	20	10	5	0
TELEORMAN	7	4	1	1
TIMIȘ	13	2	2	0
TULCEA	21	3	5	0
VASLUI	2	2	0	0
VRANCEA	4	2	0	0
ILFOV	5	4	2	2
BUCHAREST	6	4	3	2
Total	**406**	**144**	**89**	**40**

Source: Own calculation based on the data from: https://www.madr.ro/grupurile-de-producatori-si- organizatiile-recunoscute-in-romania.html

From the data presented in Table 6, in the period 2006-2025, in Romania, 406 recognition decisions and 144 withdrawal decisions were granted, of which the vegetable sector accounted for 89 recognition decisions and 40 withdrawal decisions, which indicates a lower ratio, indicating difficulties in maintaining standards and economic sustainability of the groups and therefore the need for public support and technical assistance for farmers.

CONCLUSIONS

• Romania has a high potential in organic vegetable growing, but faces small areas, modest production and high dependence on imports.
• Organic certification is a certification of the production process, not a product certification.
• The organic value chain is incompletely developed, with few processors and exporters, which limits access to international markets.
• Public policies and financial support can play a decisive role in expanding and strengthening the organic sector, in particular by supporting local processing and facilitating access to markets.
• The exchange of good practices should be intensified.
• Simple and effective measures should be identified to increase the visibility of organic products (e.g., posters, website information)
• Improve product placement by using distinctive shelf labels (e.g., green labeling) and positioning organic products in prominent locations.

REFERENCES

Avasiloaiei, D.I., Calara, M., Brezeanu, M.P., Cristea, T.O., 2023. Review on the sustainability of some regenerative agriculture practices for organic vegetable growing, Scientific Papers. Series B, Horticulture. Vol. LXVII, No. 2, 2023 Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653, 307-319

Bonciu, E., 2022. Trends in the evolution of organic agriculture at the global level - a brief review. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 22, Issue 3, 2022 PRINT ISSN 2284-7995, E-ISSN 2285-3952 81, 81-86

Brumă, I.S., Chițea, M.A., Jelea, A.R., Chițea, L.F., Rațu, R.N., 2023. The Evolution of the Romanian Organic Agriculture in a Global Context. ROMANIAN AGRICULTURAL RESEARCH, Number 41/2024, doi.org/10.59665/rar4107, 67-77

Eurostat. The fruit and vegetable sector in the EU - a statistical overview, 2024.

Eurostat. Database - Agriculture, 2024.

Eurostat. Developments in organic farming, 2024

FAO. Agricultural production statistics 2009-2023, available, https://www.fao.org/faostat, accessed on 20.07.2025.

Fawzy, Z. F., Shaymaa, I. S., Nagwa M. K. H., 2016. A Review of Organic Agricultural of Some Vegetables Crops, American Journal of Food Science and Health Vol. 2, No. 3, 2016, 25-31

Fernandez, J.A., Ayastuy, M.E., Belladonna D.P., Comezaña, M.M., Contreras J., Maria Mourão, I., Orden, L., Rodriguez, R.A., 2022. Current Trends in Organic Vegetable Crop Production: Practices and Techniques, Horticulturae 2022, 8(10), 893; https://doi.org/10.3390/horticulturae8100893

Fernandez-Cornejo, J., Greene, C., Penn, R., Newton,D., 1998. Organic vegetable production in the U.S. Certified growers and their practices, American Journal of Alternative Agriculture, Vol. 13, Issue 2, https://doi.org/10.1017/S0889189300007694, 69 - 78

Food for Thought: Pesticide Residues in the School Fruit and Vegetable Scheme (SFVS). Pesticide Action Network UK (PANUK), Brighton, UK, https://www.pan-uk.org/food-for-thought/, accessed on 30.07.2025

IFOAM. Organic Agriculture and Its Benefits for Climate and Biodiversity; IFOAM: Brussels, Belgium, 2022; pp. 1-16, accessed on 18.07.2025.

IFOAM (International Federation for Organic Agriculture Movements). 2008. "FAO Workshop on Organic Agriculture and Climate Change, accessed on 18.07.2025

Ioviță, L., Horablaga, A., Beinșan, H., Velicevici, G., Moatăr, M.M., Panici, A., Camen, D., 2024. Research on the impact of climate change on the environment: a review, Scientific Papers. Series B, Horticulture. Vol. LXVIII, No. 2, 2024 Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN- L 2285-5653, 783-787

Nielsen, 2005. Functional Foods & Organics: A global AC Nielsen online survey on consumer behavior and attitudes. ACNielsen.

Paull, J., 2023. The Global Growth and Evolution of Organic Agriculture. In J. N. Bhakta & S. Rana (Eds.), Research Advancements in Organic Farming (Ch.1, pp. 1-17). New York: Nova Science Publishers. 2023, 979-8-88697-519-2

MADR, https://www.madr.ro/docs/agricultura/agricultura-ecologica/2023/plan-nat-actiune-agri-eco-10.05.2023.pdf, accessed on 10.07.2025

MADR, https://www.madr.ro/grupurile-de-producatori-si-organizatiile-recunoscute-in-romania.html, accessed on 10.07.2025

Oshunsanya, S.O., Aliku, O., 2016. Biochar technology for sustainable organic farming. In: Organic farming-A Promising Way of Food Production, Vol. 6: 12-29.

Risku-Norja, H.; Mäenpää, I. MFA Model to Assess Economic and Environmental Consequences of Food

Production and Consumption. Ecol. Econ. 2007, 60, 700-711.
Silva Dias, J., 2011. World Importance, Marketing and Trading of Vegetables, Acta Hort. 921,
DOI:10.17660/ActaHortic.2011.921.18, 153-169
Szeikely, I.A., Tudor, V., Teodorescu, R.I., 2024. Biodiversity in vegetable culture and its role in the sustainability of agroecosystems. A review, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 24, Issue 4, PRINT ISSN 2284-7995, E-ISSN 2285-3952, WOS:001437484400038, 805-815
Tudor, V., Teodorescu, R. I., 2024. Tehnologii horticole sustenabile, Editura EX TERRA AURUM, ISBN 978-606−072-410-0, 194 pag.
Willer, H., Meier, C., Schlatter, B., Dietemann, L., Kemper, L., Trávníček, J., 2021. The World of Organic Agriculture 2021: Summary, The World of Organic Agriculture 2021: Statistics & Emerging Trends 2021. Research Institute of Organic Agriculture FiBL & IFOAM-Organics International, ISBN PRINT 978-3-03736-393-5, ISBN PDF 978-3-03736-394-2, 20-31
Willer, H.; Lernoud, J., 2017. Current statistics on organic agriculture worldwide: area, operators, and market, The World of Organic Agriculture Statistics and Emerging Trends 2017. Research Institute of Organic Agriculture FiBL & IFOAM-Organics International, ISBN PRINT 978-3-03736-03736-040-8, ISBN PDF 978-3-03736-03736-041-3, 36-77