

## The Organic Agriculture: World trends and Opportunities

Olga Khodakivska

*National Scientific Center "Institute of Agrarian Economics", Kyiv, Ukraine*

Mykola Pugachov

*National Scientific Center "Institute of Agrarian Economics", Kyiv, Ukraine*

Natalia Hermaniuk

*Vinnitsia National Agrarian University, Vinnitsa, Ukraine*

Oleksiy Mohylnyi

*Ukrainian Research Institute of Productivity of Agroindustrial Complex, Kyiv, Ukraine*

Oleh Tomashuk

*Institute of Feed Research and Agriculture of Podillia of the National Academy of Agrarian Sciences of Ukraine, Vinnitsa, Ukraine*

Olena Gryshchenko

*National Scientific Center "Institute of Agrarian Economics", Kyiv, Ukraine*

### Abstract

*This article deals with justification of theoretical principles of development of organic production, determination of its basic advantages and further prospects considering internationally approved practice of development and government regulation. When carrying out this research, general scientific and special methods of scientific knowledge, in particular, dialectic, system approach, statistics and economic analysis were used. It is determined that the market capacity of the world organic products is showing a stable upward tendency and it has reached \$90 billion. Annual growth rates are 10-15 percent. There are 2.7 million certified organic producers in the world, over three quarters of which are in the developing countries. Global trend in the development of organic production has a key influence on the formation of the national organic products markets. It is established that the developed countries introduced special aid programs for the organic sector that provide for direct subsidies to farmers and informational support to producers. On the whole, this strengthens domestic markets of organic products, enhances potential export and deals with economic and ecological problems.*

*Keywords: agriculture, crops, organic food market, organic land, government support.*

### Background

Organic production is rapidly developing in the EU countries and the world, and it is aimed at improving the health of the population by producing high-quality food, raw materials and other products, preserving soil fertility and the environment (Reganold and Wachter 2016; Brzezina et al. 2017; Willer and Lernoud 2017). The era of global revision of the world agrarian strategy began at the end of the last millennium and lasts until today. A new model "Better Quality and Safer" comes to replace the existing "More and Cheaper" agricultural model. Significant areas of land are used for organic production in the world. The number of "organic" farms has enjoyed an over twenty-fold increase only in EU countries during the recent fifteen years (Willer and Lernoud 2017).

The issues of the formation and development of organic agriculture, its impact on economic, social and environmental components of agricultural production are highlighted in the works of numerous researchers.

Quite often, researchers consider organic production as an innovative and important way of managing, able to ensure the production of eco-friendly food products through its potential to balance key sustainable development goals (Lotter 2003; Rousseau and Vranken 2013; Ceccarelli 2014; Kociszewski 2014; Reganold and Wachter 2016; Brzezina et al. 2017).

Scientific publications much attention pay to the development of organic production in the national context, which reveals the features of a particular country, taking into account its natural resource potential, consumer preferences, and others (Bitsaki et al. 2003; Acs et al. 2007; Melece 2010; Weiss 2013; Dinis et al. 2015; Shcherbakova 2018).

At the same time part of the authors emphasize the dependence of organic farms on direct payments (Offermann et al. 2009; Zander et al. 2008), while other researchers point out financial competitiveness of organic agriculture on a global scale (Crowder and Reganold 2015).

However, owing to different circumstances, some countries, particularly the developing ones, have not fully actualized its available natural, economic and resource potential of the organic sector development that causes the need to justify theoretical basis, to identify its basic principles, advantages and further prospects taking into consideration internationally approved practice and state regulation.

The purpose of the article – is to reveal the theoretical basis of organic farming, to identify its basic principles, features and trends of development for the period of 2000-2017 and prospects until 2025.

### **Research Methods**

When carrying out the research general scientific and special methods of scientific cognition have been used. The dialectic method of cognition is a basis for determining the economic essence of concepts and the logical sequence of their statement. Such methods as statistical, economic, historical, logical, forecasting (second order polynomial), index method and structural analyses were used to assess the current conditions of organic production and determine its development prospects.

The research used the data of World and Europe organic agricultural reports 2000-2017, the data of Federal Office for Agriculture FOAG of Switzerland, *International Federation of Organic Agriculture Movements (IFOAM)*, Federal Ministry of Food and Agriculture of Germany, Research Institute of Organic Agriculture (FiBL) and Institute of Agrarian Economics.

### **Results and Discussion**

#### **Theoretical Definition and Economic Essence**

The term "organic agriculture" in general terms implies a special system of agriculture that does not allow to use chemically synthesized fertilizers and toxic chemicals. However, it is not the only characteristic. Earlier, the researchers of the US Department of Agriculture suggested to define organic production as a system of agricultural production that does not allow or significantly limits to use chemically synthesized fertilizers, plants protection tools and growth promoters. This system is based on the application of crop rotation, composts, bean and leguminous cultures, manure, organic production wastes, mineral raw materials, mechanical and biological fighting methods against weeds and wreckers and is aimed to increase soil fertility, improve its structure with simultaneous nutrition of plants (Report and Recommendation 1980).

In the process of formation and development of world organic production, various approaches to its definition have been offered. In particular, in 1995 the US National Standards Board offered its own interpretation of organic production. According to that definition organic production is "the system of ecological management which is aimed at preservation of a biodiversity, maintenance of biological cycles and improvement of biological activity of soils. It mainly consists of the minimum use of unnatural (artificial) raw materials and broad usage of agrotechnical methods which revive, support and improve ecological harmony" (National Organic Standard, 2005). In line with this definition, the key principle of organic production is the use of such methods, tools, and technological solutions that will not result in ecological disruption in agroecosystems, and on the contrary, increase their stability. At the same time, its main goal is to maintain an appropriate level of health, productivity optimization of soil fauna, preservation of plant and animal life.

The International Federation of the Organic Movement suggests considering "organic agriculture" as a set of various agricultural practices that provide ecologically safe, socially oriented and economically viable production of agricultural products and raw materials. The use of local and specific fertility of soils as the defining component of effective production is the basis for such systems. These farming models are based on the full use of the natural potential of plants and animals. Organic agriculture significantly reduces the use of the third-party factors in production due to restrictions on usage of fertilizers, pesticides, and pharmaceuticals synthesized in a chemical way. In addition, to increase the crop capacity and protection of plants agrotechnological actions and various natural factors are used (National Organic Standard 2005).

The advantages of organic agriculture according to the United Nations Food and Agriculture Organization (FAO) include: a) long-term environmental sustainability; b) preservation and reproduction of soil fertility; c) rational use of water resources; d) conservation of biodiversity; e) refusal to use genetically modified

organisms (GMOs); e) maintaining ecological balance in agroecosystem and its assimilation abilities (The advantages 2010).

In our opinion, the production of organic products (raw materials) means the production activity of natural persons or legal entities for whom, during such production, the use of chemical fertilizers, pesticides, genetically modified organisms (GMO), preservatives, etc. is forbidden, and at all production stages the methods, the principles and the rules for receiving natural (ecological) production and also preservation and restoration of natural resources are applied. At the same time, it is very important to ensure the regulation of organic production, which should be aimed at providing fair competition and appropriate functioning of the organic production market, the improvement of key indicators of health, preservation of the environment, rational use of soils, rational use and reproduction of natural resources and also ensures consumers' confidence in products and raw materials, marked as organic (Khodakivska 2015).

Now it became obvious that the well-being of humanity, achieved due to degradation of the environment, threatens the existence of human as a biological species, his/her physical and mental health and, especially, the health of future generations. In such a situation, the humanity has a civilized solution – to adhere to the dynamic balance between welfare and the preservation of a friendly (favorable) environment and thus enter a trajectory of sustainable (balanced) development (Melnikiene et al. 2018). Organic agriculture, having significant environmental benefits over traditional ones, provides prospects for the development of economic systems (Kociszewski 2014).

In addition, it forms the basis of sustainable rural development, providing the solution to the environmental, economic and social problems of our time.

Consumption of excessive amounts of resources has negatively influenced on Earth's ecology and caused a higher amount of environmental disasters (desertification of the territories destruction of atmosphere's ozone layer, unprecedented development of soil erosions, intense acid rainfalls, deterioration of drinking water quality, reduction of biodiversity, global climate changes, greenhouse effect). The emergence of a real threat to the existence of human civilization and life on the planet is due to the inconsistency of economic growth with the potential of nature, which leads to increased degradation processes (Aghion et al. 2014; Walker 2014).

This brings necessity for the rapid transition to sustainable development (Holden et al. 2017). The basic idea of sustainable development reflects the complexity of the relationship between economic activity of society and the natural environment, which is a closed ecological system that can not constantly increase and has limited material resources (World Bank 2017).

In the era of globalization of national economies and the intensification of international economic integration processes, solving environmental problems and ensuring the needs of the population in environmentally safe food products has become one of the key priorities of humanity. Thanks to the mechanisms of economic stimulation, tax privileges, direct government subsidies, that are used by government programs in many developed countries, organic production has become one of the priority areas of agriculture (UN General Assembly 2015). Taking into account food risks, environmental safety and other factors (Sovacool 2014), the environmental and economic justification of these processes and the identification of general trends and prospects for further development remain relevant.

### World Trends in Organic Agriculture Development

According to the International Federation of Organic Agriculture Movements (IFOAM) and the Research Institute of Organic Agriculture (FiBL), the areas of organic farming in the world are steadily increasing. For the past eighteen years, their size has increased by 4.6 times and by 2017 amounted to 69.8 million hectares. Statistical information on organic farming comes from 181 countries (Willer 2019). In Europe, the organic sector is represented in almost all the countries (Table 1).

**Table 1. Organic sector by continents, 2017**

Continent	Number of countries with organic farming	Organic area, million hectares	Share of the global organic farmland area, %	Organic share of total farmland area, %	Number organic producers, 1 000	Share of the global organic producers, %	Organic retail sales, billion €	Share of the global organic retail sales, %

Europe	47	14.6	20.9	2.9	456	15.9	37.3	40.5
Asia	41	6.1	8.7	0.4	815	28.5	9.6	10.4
Africa	44	2.1	3.0	0.2	1144	40.0	0.02	0.02
Latin America	33	8.0	11.5	1.1	398	13.9	0.8	0.9
Australia and Oceania	13	35.6	51.0	8.5	19	0.7	1.3	1.4
North America	3	3.2	4.6	0.8	27	0.9	43.0	46.7
World in general	181	69.8	100	1.4	2858	100	92.1	100

Source: FiBL, IFOAM and SOEL, 2019.

As many as 2.8 million organic producers are certified in the world, more than three quarters of which are in developing countries. In 2017, 1.4 percent of the world's agricultural land area were planted for organic production. In the countries of the European Union, organic farming corresponds to 7.17% of all agricultural land.

The largest share of organic area in the global farmland belongs to Oceania (51.0%). However, the largest volume of sales of organic products is in North America (46.7%) and Europe (40.5%) (Figure 1).

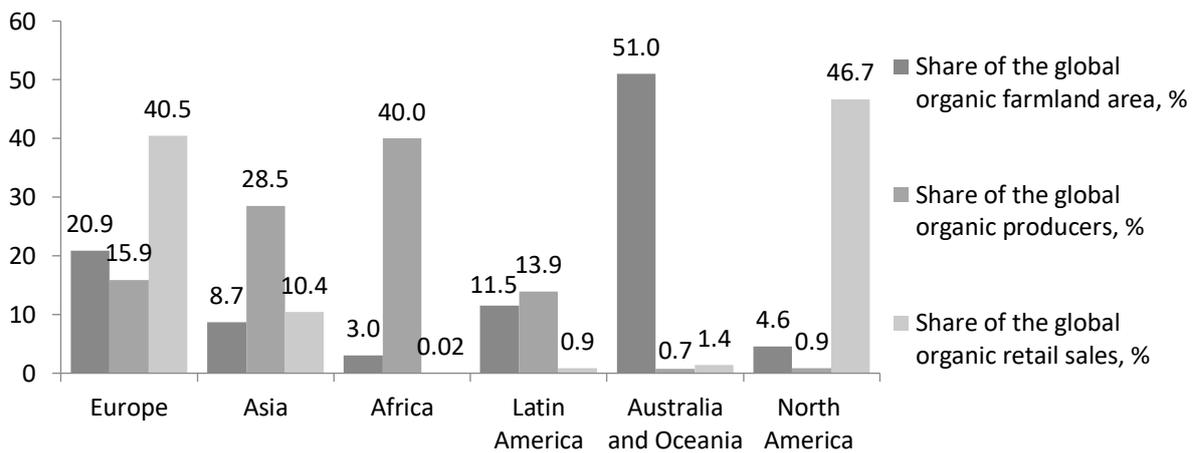


Figure 1. Share of continents in the global organic area (farmland), organic producers and global organic retail sales, % (2017)

Source: FiBL, IFOAM and SOEL, 2019.

Asia is leading in speed of growth of organic areas, followed by Asia, are Africa and Oceania (Figure 2). Asia and Oceania are leading in speed of growth of organic retail sales (Figure 3). Despite the fact that the size of organic products market in these regions is low.

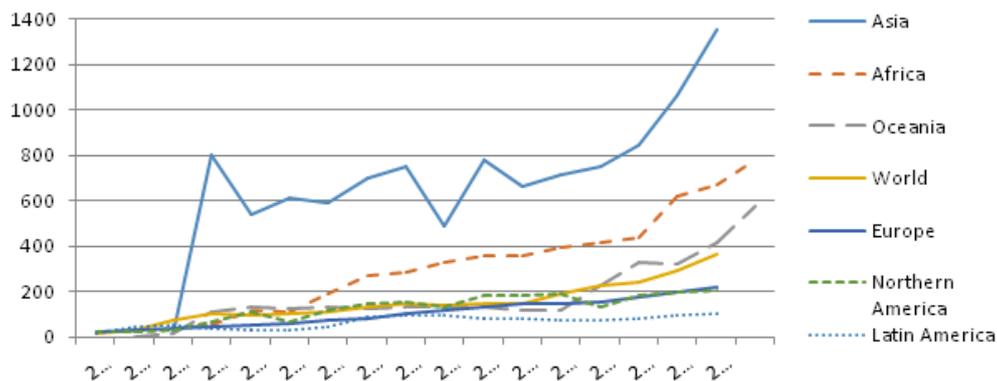


Figure 2. The growth rates of organic areas by continents (up to 2000), %

Source: calculated according to data: <https://statistics.fibl.org/world>.

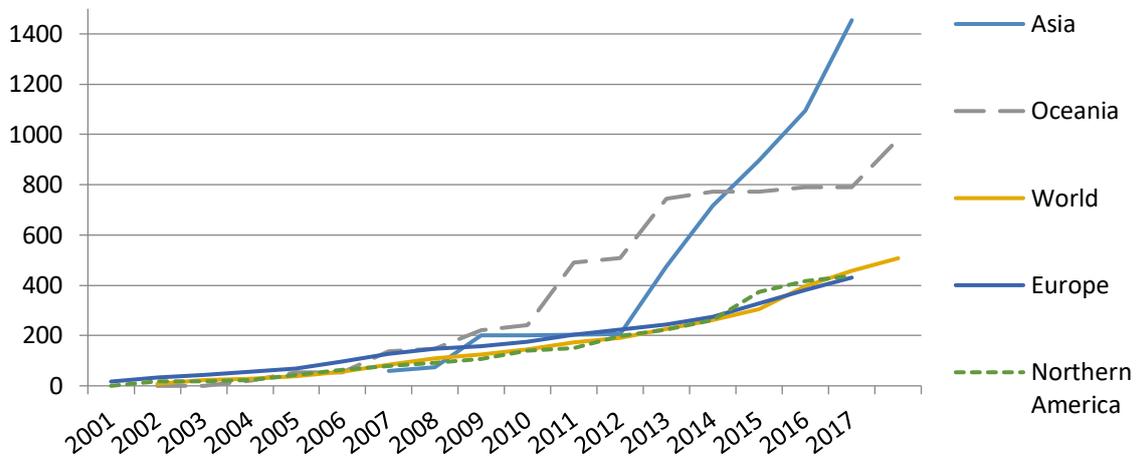


Figure 3. The growth rates of organic retail sales by continents (up to 2000), %

\* There is no data available for Africa and Latin America.

Source: calculated according to data: <https://statistics.fibl.org/world>.

Organic food markets are successfully operating in many countries around the world. First of all, they are in the USA and the EU, where necessary market infrastructure is formed. According to experts, the market of organic products is constantly growing in the world. In particular, in 2000 it was estimated at \$15 billion a year, in 2006 it was about \$30 billion, and in 2017 it reached \$92 billion. Annual growth rates are 10-15 percent. The bulk of organic products is sold in highly developed industrial countries of the world. In particular, about 90 percent of its total consumption falls on the countries in West Europe and North America. The most developed markets of organic products are concentrated in the US, Germany and France. Among the European countries, the sales leader of organic products is Germany (over €9.4 billion per year) (Fedorov et al. 2011; Demko and Jaenicke 2018; Willer 2019).

With regard to the consumption of organic products, Switzerland is a worldwide leader, where the average cost of organic foods per capita makes €274 euros per year, whereas Denmark with €227 holds the second position, and Sweden with €197 is ranking third. Quite often there is a relationship between organic per capita consumption (€/person) and organic area share of total farmland. In particular, this applies to highly developed countries such as Liechtenstein, Austria, Sweden, Switzerland, Denmark et al (Figure 4).

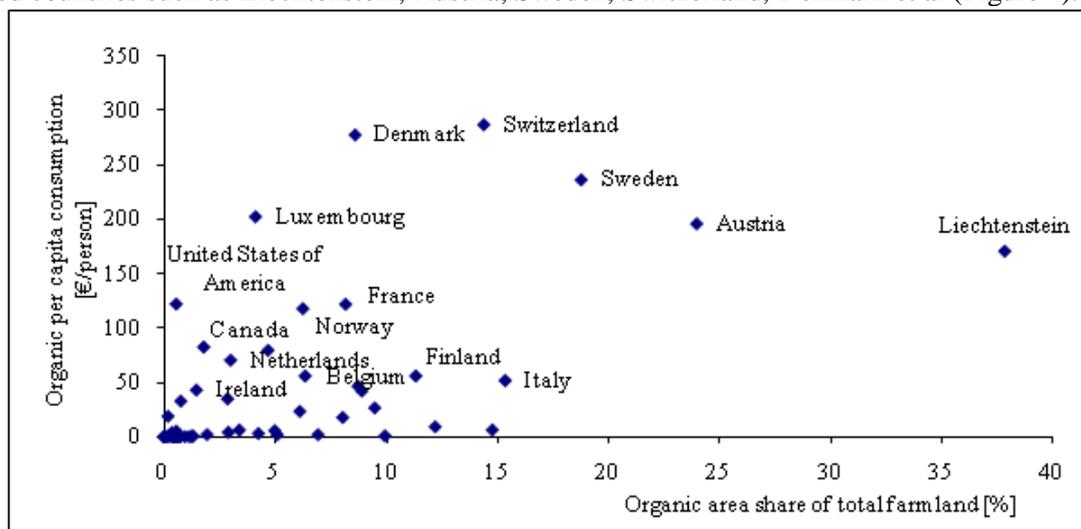


Figure 4. Distribution of countries depending on organic per capita consumption (€/person) and organic area share of total farmland (%) (2017)

Source: author's research.

The main motives for consuming organic products areas follows: ecological safety of food; a better taste; preservation of the natural environment in the process of production; the absence of genetically modified organisms. Analyzing the peculiarities of foreign experience, we have made a conclusion about typical consumers of organic products. They are mainly urban residents with high purchasing ability who belong to the middle and upper social classes, concerned about their family members' health and are focused on quality products.

### Organic Farmland and State Support in Europe

The rapid increase in the area of agricultural land used for organic production in European countries began in 1990 and lasted until 2000. Nowadays, this trend persists, but the growth rate has significantly decreased.

Spain is the leader in the area of land occupied under organic production in Europe accounting for 2.0 million hectares. Turkey is leading by the number of organic producers (67.9 thousand). Russia has the largest average organic farming area (5.3 thousand hectares), Malta is the smallest among them (1.7 hectares). The average area of organic farming in Europe 36.2 hectares.

The largest share of land occupied by organic production in the total area of agricultural land, belongs to Liechtenstein (37.7 percent), and Austria covers the second largest area of 21.9 percent.

In the structure of agricultural land in Europe, arable land makes 45 percent, pastures account for 42 percent and perennial plantations occupy 11 percent.

Cereals (42 percent) and green fodder (41 percent) predominate in the structure of crops. Among permanent crops, the largest share is occupied by olive (41 percent), grapes account for 23 percent, nuts – 19 percent, temperate fruits – 9 percent and citrus fruits – 3 percent.

In recent years the share of land occupied under organic agriculture has considerably increased. It has been promoted by the active policy of the EU aimed to support farms in shifting from traditional to organic production (Czyzewski et al. 2018). For example, during 2001 Polish "organic" farms received subsidies of \$108 for every 100 hectares of arable land, \$38 per hectare of pastures and about \$150 for each hectare of long-term plantings. Besides, the state also partially compensated the cost of certification of farms according to organic standards. In 2013 the subsidies per hectare of arable lands in Poland grew to €202 per hectare, meadows and pastures – to €66 per hectare, perennials – to €395 per hectare. In Germany and France, the subsidies assigned for support of organic agricultural industry during the transition (conversion) period in some cases reached €950 per hectare. These subsidies are saved for the period 2014-2020 (Table 2).

**Table 2. Direct payments (subsidies) to organic producers in individual member states of the EU, euro/ha**

Agricultural land		France	Poland	Germany	Switzerland
Transition period	Arable land	200	215	220	...
	Meadows and pastures	100	85	220	...
	Gardening and berry growing	100-900	461	950	...
	Vegetable farming	350-900	397	575	...
Certified organic production	Arable land	100-151	202	180	647
	Meadows and pastures	80-151	66	190	162
	Gardening and berry growing	590-900	395	750	970
	Vegetable farming	150-160	333	350	970

Source: Bundesamt für Landwirtschaft, BLW (2011), BMELV (2013), The Institute of Agrarian Economics data (Khodakivska 2015).

Certain countries that started the development of organic production have also created specific government programs that provide for direct subsidies and direct payments for farmers to compensate the expenditures for certification. Additionally there is also constant informational support for producers of organic products

from central and local governments that strengthens the internal markets of organic products, enhances potential export and deals with economic and ecological problems of the country.

At present in Europe, the growth rate of demand exceeds the growth rate of supply for organic products. According to the forecast, this trend will continue to grow (Figure 5).

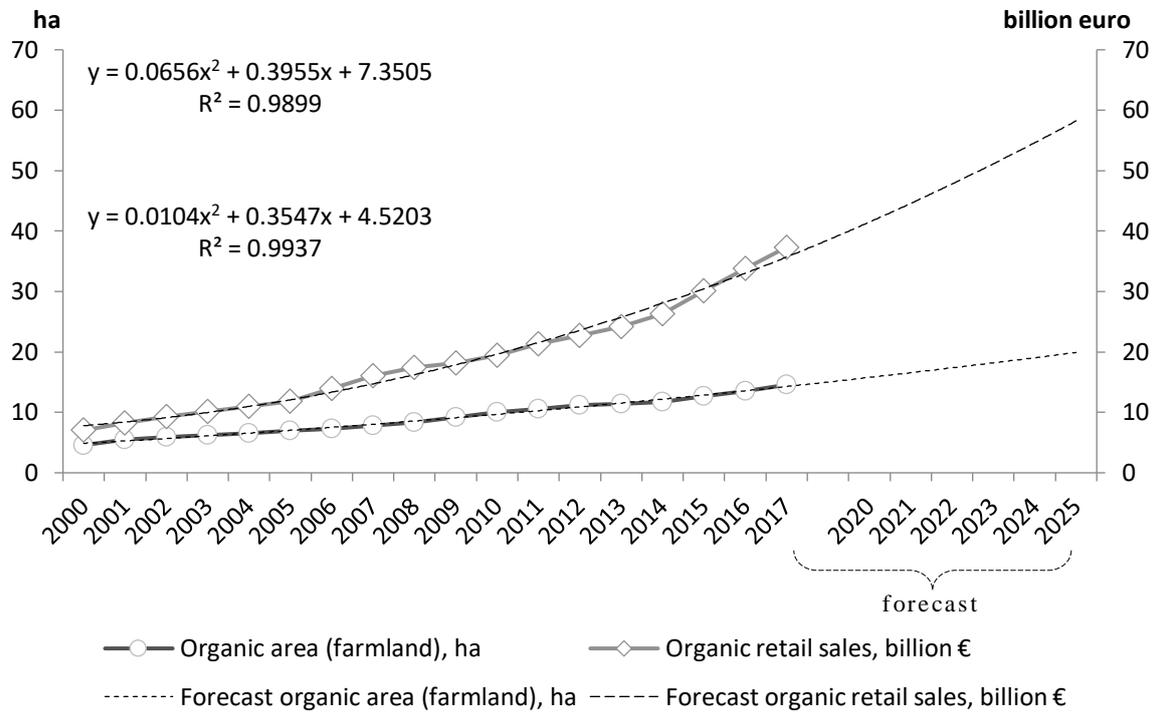


Figure 5. Trends increase organic retail sales and organic area in Europe

Source: calculated according to data: <https://statistics.fibl.org/europe>.

In Europe, a significant share of organic area is concentrated in the EU. In 2000, the share of the EU in organic farmland of Europe was 95.7%. Over time, this trend has changed. In the 2017 the share of certified organic areas in other European countries was about 12% (Figure 6).

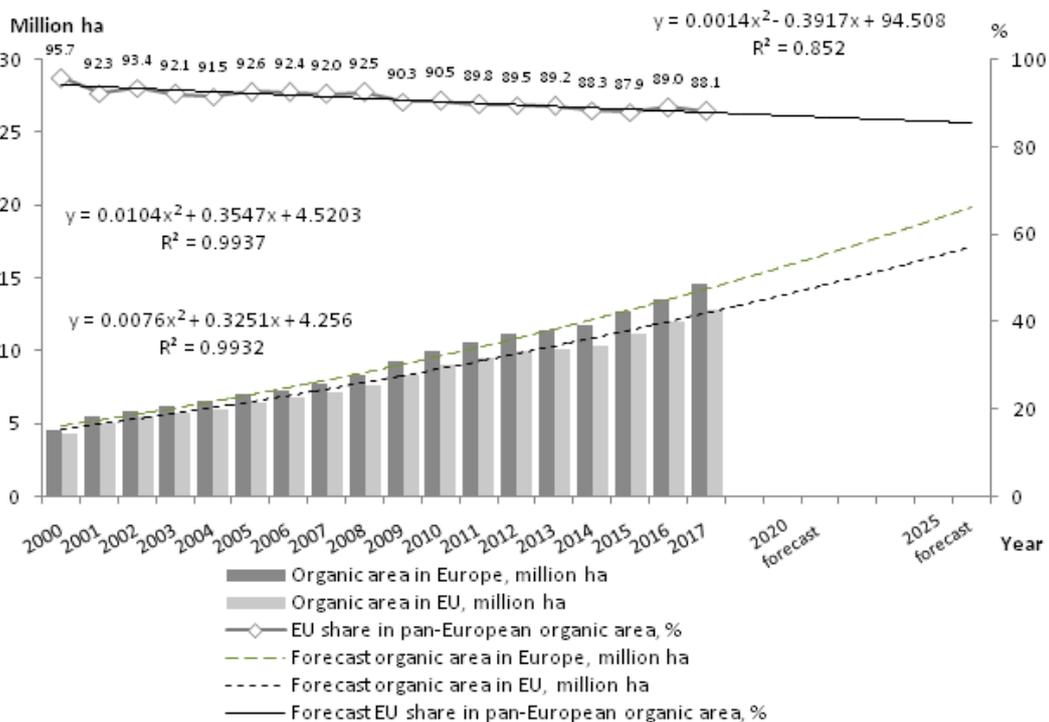


Figure 6. Organic area in Europe and share of the EU in the pan-European area of organic land

Source: calculated according to data: <https://statistics.fibl.org/europe>.

In response to the challenges posed by a fast growth of agriculture organic farming areas in Europe, which is a direct result of increased consumer interest in organic products, and in order to provide an effective legal framework for the industry, the EU has passed new legislation, that will come into force on 1 January 2021. The new regulation is designed to ensure fair competition for farmers whilst preventing fraud and maintaining consumer trust through the following points: a strengthening of the control system, helping to build further consumer confidence in the EU organics system new rules for producers which will make it easier for smaller farmers to convert to organic production new rules on imported organics to ensure that all organic products sold in the European Union are of the same standard a greater range of products that can be marketed as organic (Regulation 2018).

It is expected that such steps will stimulate growth in the capacity of the organic produce market and increase its supply.

Each year we observe the increase in the number of countries, developing their own standards of cultivating organic products, enhancing the areas used for organic agriculture and supporting the principles of ecologically friendly agriculture. Given such circumstances, we may speak about positive prospects for the development of this sphere in the world.

### Conclusions

The undeniable ecological, social and economic advantages of organic agriculture is the simultaneous achievement of agricultural productivity, improved quality of ecosystem services and preserving the health of the present and future generations that fully meets the requirements of the concept of sustainable (balanced) development.

This study allowed to establish the following trends in the development of the world organic market: 1) organic products market continues to grow steadily; 2) demand is concentrated in developed countries; 3) in Europe, demand is growing at a faster pace than supply; 4) the pace of production is higher than the growth rate of demand in developing countries; 5) state support for organic producers grows.

Organic production aimed at improving the health of population through production of high-quality food, raw materials and other products, preserving soil fertility and the environment is rapidly developing in the EU and the world. The areas of organic farming in the world are steadily increasing. For the past fifteen years, their size has increased by 5.2 times and by 2017 amounted to 69.8 million hectares. 2.8 million organic producers in the world have been certified, more than three quarters of which are in the developing countries.

The vast majority of organic production in the world is made in the developing countries (Asia, Latin America and Eastern Europe). However, the main consumers of these products are the developed countries. About 90 percent of their total consumption falls on the countries of Western Europe and North America. The most developed markets of organic products are concentrated in the US, Germany and France.

It should be noted that the organizational and economic model of organic agriculture is constructed in such a way that it promotes the development of social infrastructure, supports the development of rural green and agricultural tourism, and aims at ensuring sustainable development of rural areas. As the income of rural households increases, the standard and quality of life in the village rise, self-employment, social infrastructure develop, and the dependence of the budgets of territorial communities on the state and regional budgets decreases.

### References

1. Acs S., Berentsen P.B.M., Wolf M., Huirne R.B.M. (2007): Comparison of conventional and organic arable farming systems in the Netherlands by means of bio-economic modeling. *Biological Agricultural Horticulture*, 24: 341–361. <https://doi.org/10.1080/01448765.2007.9755032>
2. Aghion P., Hepburn C., Teytelboym A. and Zenghelis D. (2014): Path-Dependency, Innovation and the Economics of Climate Change. Supporting paper for New Climate Economy. London: Grantham Research Institute on Climate Change and the Environment.
3. Basic Standards IFOAM (2002): Approved by the IFOA General Assembly, Victoria, Canada. Available at [www.ifoam.org](http://www.ifoam.org) (accessed Apr 10, 2018).

4. Berlach N.A. (2010): The system of principles of administrative and legal regulation of organic agriculture in Ukraine. *Journal of the Academy of Advocacy of Ukraine*, 2: 1–4.
5. Bitsaki A., Vassiliou A., Kabourakis E. (2003): **Organic farming in Greece trends and perspectives**. In : Nikolaidis A. (ed.), Baourakis G. (ed.), Isikli E. (eds), Yercan M. (eds). The market for organic products in the Mediterranean region. CIHEAM, Chania, 53–65.
6. Brzezina N., Biely K., Helfgott A., Kopainsky B., Vervoort J., Mathijs E. (2017): Development of Organic Farming in Europe at the Crossroads: Looking for the Way Forward through System Archetypes *Lenses.Sustainability*, 9: 821–840. <https://doi.org/10.3390/su9050821>
7. Ceccarelli S. (2014): GM crops, organic agriculture and breeding for sustainability. *Sustainability*, 6: 4273–4286. <https://doi.org/10.3390/su6074273>
8. Crowder D.W., Reganold J.P. (2015): Financial competitiveness of organic agriculture on a global scale. *Proceedings of the National Academy of Sciences of USA*, 112 (24): 7611–7616. <https://doi.org/10.1073/pnas.1423674112>
9. Czyzewski B., Guth M., Matuszczak A. (2018): The impact of the CAP “Green” programmes on farm productivity and its social contribution. *Problemy Ekorozwoju –Problems of Sustainable Development*, 13 (1): 173–183.
10. Dinis I., Ortolani L., Bocci R., Brites C. (2015): Organic agriculture values and practices in Portugal and Italy. *Agricultural System*, 136: 39–45. <https://doi.org/10.1016/j.agsy.2015.01.007>
11. Demko I., Jaenicke E. C. (2018): Impact of European Union–U.S. Organic Equivalency Arrangement on U.S. Exports. *Applied Economic Perspectives and Policy*, 40: 43–64.
12. Fedorov M.M., Khodakivska O. V., Korchynska S. H. (2011): The development of organic production, NSC IAE, Kyiv: 170.
13. Holden E., Linnerud K. and Banister D. (2017): The imperatives of sustainable development. *Sustainable Development*, 25(3): 213–226. <https://doi.org/10.1002/sd.1647>
14. Khodakivska O.V. (2015): Ecologization of agrarian production, NSC IAE, Kyiv: 350.
15. Kociszewski K. (2014): Perspektywy rozwoju rolnictwa ekologicznego w świetle wyników badań gospodarstw know encjonalnych. *Journal of Agribusiness and Rural Development*, 1 (31): 59–68.
16. Kulynych P.F. (2009): Production of organic and environmentally friendly agricultural products: land-legal aspects. *State and Law: a collection of scientific works, Legal and political sciences*, 43: 414–429.
17. Lotter D.W. (2003): Organic agriculture. *Journal of Sustainable Agriculture*, 21(4): 59–128.
18. Melece L. (2010): Development and future perspectives of organic farming in Latvia. *Social Sciences Magazine*, 1 (2): 247–258.
19. Melnikiene R., Eicaite O., Volkov A. (2018): Sustainable development of agriculture: policy formulation and assessment of constraints. *Public Policy and Administration*, 17 (2): 226–239. <https://doi.org/10.13165/VPA-18-17-2-06>
20. National Organic Standard Board Recommendations (2005): National Organic Program USDA. Available at <http://www.undpsust.kiev.ua/Docslu.htm> (accessed May 5, 2018).
21. Offermann F., Nieberg H., Zander K. (2009): Dependency of organic farms on direct payments in selected EU member states: Today and tomorrow. *Food Policy*, 34: 273–279.
22. Organic Production Systems: General Principles and Management Standards (2006): ICS 67.040, Standards Council of Canada, Gatineau: 48.
23. Reganold J.P., Wachter J.M. (2016): Organic agriculture in the twenty-first century. *Natural Plants*, 2: 1–8.
24. Regulation (EU) (2018): Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. <https://eur-lex.europa.eu/eli/reg/2018/848/oj>
25. Report and Recommendations on Organic Farming (1980): DS: USDA, Washington: 210.
26. Rousseau S., Vranken L. (2013): Green market expansion by reducing information asymmetries: Evidence for labeled organic food products. *Food Policy*, 40: 31–43.
27. Sovacool B.K. (2014): Energy studies need social science. *Nature*, 511: 529–530.
28. Shcherbakova A. (2018): Perspectives on development of organic agriculture in Russia. *Amazonian Journal of Plant Resear*, 2(2): 161–174. <https://doi.org/10.26545/ajpr.2018.b00020x>
29. The advantages of organic agriculture in terms of ecology (2010): Available at <http://www.fao.org/organicag/oa-faq/oa-faq6/ru/> (accessed May 10, 2018).
30. UN General Assembly (2015): Transforming our world: the 2030 agenda for sustainable development.

Resolution adopted by the General Assembly on 25 September 2015.  
<http://www.un.org/sustainabledevelopment/development-agenda>

31. Walker G. (2014): The dynamics of energy demand: change, rhythm and synchronicity. *Energy Research & Social Science*, 1: 49–55. <https://doi.org/10.1016/j.erss.2014.03.012>
32. Watson C. A., Atkinson D., Gosling P., Jackson L. R., and Rayns F. W. (2002): Managing Soil Fertility in Organic Farming Systems. *Soil Use and Management*, 18 (1): 239–247.
33. Willer H., Lernoud J. (2019): *The World of Organic Agriculture. Statistics and Emerging Trends*, FiBL, IFOAM, Auflage Leitfaden, Handbuch: 350.
34. Weiss B. (2013): Organic farming and agricultural movements in Spain. *Green European Journal*, 5: 56–59. <https://www.greeneuropeanjournal.eu/organic-farming-and-agricultural-movements-in-spain>.
35. World Bank (2017): *Enabling the Business of Agriculture*, World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/25966>
36. Zander K., Nieberg H., Offermann F. (2008): Financial relevance of organic farming payments for Western and Eastern European organic farms. *Renewable Agriculture and Food Systems*, 23 (01): 53–61.