

## РОЗДІЛ 1

### Економіка природокористування і еколого-економічні проблеми

#### The Development of Green Technologies in the Agro-Industrial Complex: the EU Experience and the Prospects for Ukraine

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Today the modern trend in the world agriculture complex is development of the organic agriculture production through implementation “green” technologies in farming, livestock farming, poultry farming etc. The article deals with the investigation of the international modern trends in the organic production. The article analyzed state of domestic organic poultry farming and determines its main future development prospects for Ukraine. The analyzed world share of organic producers, the scale of global organic products market show strong tendencies in the way of the development the organic production, where the share of global organic product market belongs by developed countries. The authors analyzed the key benefits of world organic production, which include not only traditional understanding of the problem and also economic, ecological and social determinants. The analysis of the current situation in Ukraine allows concluding that the organic product market is generally represented by local producers, which are not always certified, but de facto operate in compliance with organic standards. These producers can become the basis for the formation of the “organic” market, the driving force for implementation the green technologies in agriculture sphere and their experience can help to develop this industry. The authors emphasized that the precondition for organic poultry farming expansion have to be the certified agricultural lands in Ukraine. Besides the article summarized the main perspectives for poultry farming development in Ukraine and determine the basic requirements for organic poultry farming. The main constraints of the organic poultry farming development were analyzed in the paper.

*Keywords:* organic agriculture, organic production, benefit, poultry farming, certification, potential.

*УДК* 631.417:636.01:636.5:061.1ЄС (477)

*JEL Codes:* O130, Q120, Q240

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**Problem statement.** Currently, the development of organic agriculture is one of the most promising directions for the development of any state. Ukraine with its favorable conditions for organic agricultural production: climatic conditions, geographical location, proximity to potential internal buyers, large territory with fertile soils, begins to use its own potential for the domestic organic production. Organic animal breeding harmoniously unite soil, plants and livestock, taking into account the physiological needs and behavior of farm animals and feeding them with high quality, organically grown forages. Stock breeding is extremely important for organic farming system in relation to the maintenance of the current level of soil fertility and its increase; influence on flora through cattle grazing; biodiversity increase through simplification of additional interaction of species within the farm, and diversification of management system. At the same time, Ukraine has an ideal environment for the development of organic poultry, and therefore, in the near future, has every chance to become a powerful organic poultry exporter. The organic poultry market is characterized by a growing supply and demand for poultry and eggs. Thus, a thorough assessment of the existing prerequisites for the formation and development of the domestic ecologically oriented agrarian production is urgent.

**Recent research.** V. I. Artish, N. H. Grabak, O. T. Dudar, M. V. Kapshtyk, M. I. Kobets, O. V. Shubravska, etc. studied the current state and prospects for organic production development in Ukraine. Despite numerous researches, the scientific grounding of the importance of organic agricultural production development, livestock in particular, is crucial.

**Goal of the article.** The research aims to investigate the state of organic poultry farming and determine its future development prospects for Ukraine. The main task is to analyze the current state of organic poultry farming, determine its development prospects; detect development factors and form of a complex of incentives for organic production.

Currently, 1.2 percent of the world's agricultural land is organic. The highest organic shares of the total agricultural land, by region, are in Oceania (6.5 percent) and in Europe (2.7 percent; European Union 6.7 percent). However, some countries reach far higher shares: Liechtenstein (37.7 percent) and French Polynesia (31.3 percent) have the highest organic shares. In fifteen countries, 10 percent or more of the agricultural land is organic [1, 11]. Figure 1 shows the world share of organic producers.

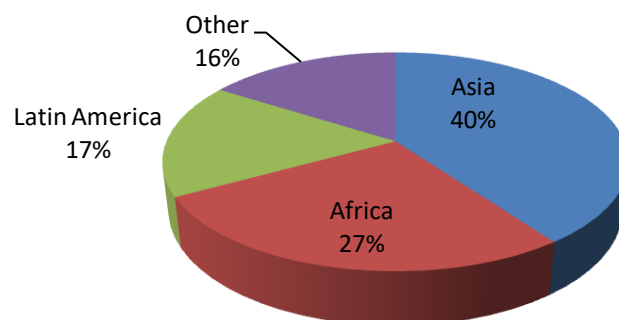


Figure 1. The world share of organic producers by region

Organic food & drink sales have increased from less than 15 billion US dollars to almost 90 billion US dollars over two decades according to Ecovia Intelligence [3]. Although the positive trend is likely to continue, there remain challenges. These include demand concentration (about 90 percent of sales are in North America and Europe), proliferating standards, and the fact that the farmland growth is slowing in parts of Europe and North America, which means there are concerns about supply shortfalls (Fig. 2).

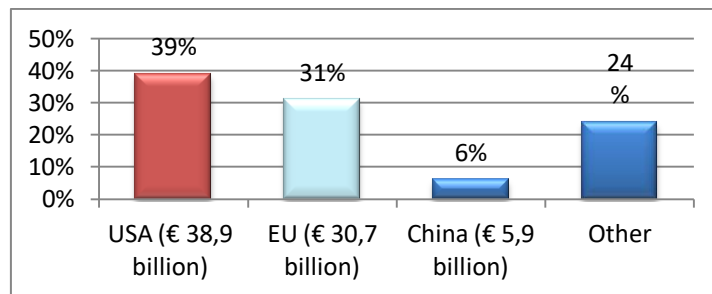


Figure 2. The share of global organic product market by country

Organic farming as a holistic system of farming and production that combines best practices of natural resource conservation, the application of high standards of proper maintenance of animals and production methods that meet certain requirements for products which are manufactured using natural substances and processes [12]. The long-term experience of different countries demonstrates the ecological, economic and social benefits of organic production (Fig. 3).

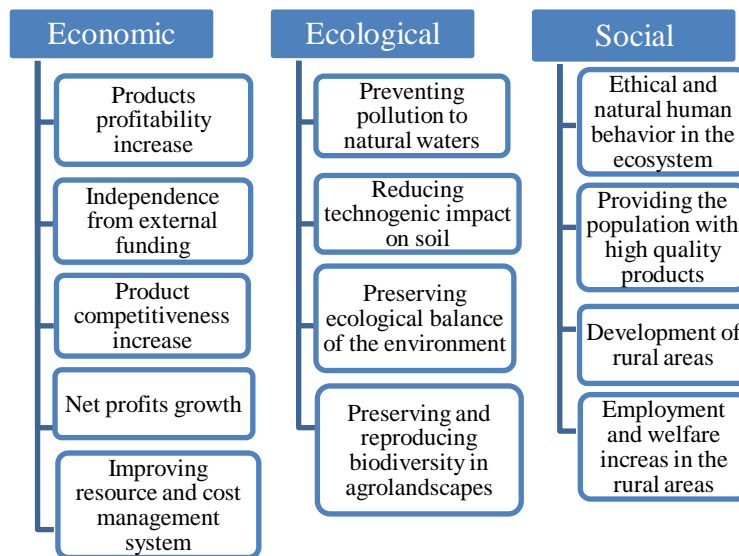


Figure 3. Key benefits of world organic production [4]

The world market of certified organic products was valued more than \$100 billion in 2016–2017. It proves the development of world green production technologies. Meanwhile, according to the Swiss-Ukrainian FIBL project [2], Ukraine ranks 11<sup>th</sup> among the European organic producers and 5<sup>th</sup> for organic production increase. Ukraine could become one of the five largest organic producers in the world by 2020.

In recent years, Ukraine’s organic product market has been increasing due to organic raw materials processing. In particular, it refers to cereals, flour, dairy and meat products, juices, syrups, jam, honey, oil, tea, and medical herbs. However, Ukrainians consume far less organic products (€ 3 per capita) than the EU residents (€ 53.7 per capita). Ukraine ranks 25<sup>th</sup> in organic product market volume in Europe: the hectare of organic land gives € 50 to the domestic market, compared to € 2,455 in Europe [1].

Due to a wide diversification of the domestic agricultural products and the characteristics of each agricultural production sectors, it is obviously impossible to find a single suitable strategy that satisfies the whole agrarian sector. Each sector of agricultural production must be considered separately. It is necessary to move from the general rules to specific steps, from organic market “origin” to “a market share” or at least “active development”.

The analysis of the current situation allows concluding that the organic product market is generally represented by local producers, which are not always certified, but de facto operate in compliance with organic standards. These producers can become the basis for the formation of “organic” market, and their experience can help to develop this industry.

Current organic poultry farming is a so-called “niche”, which will bring Ukraine to a new level of organic livestock production development, and will allow Ukraine to climb a few steps in the world organic producers ranking. This will enable Ukraine to expand its sales channels and strengthen in the “organic” market [9]. The share of organic poultry breeding is significant in organic market in the European Union compared to Ukraine. Thus, in 2015, there were 31.6 million heads of organic birds, 13.8 million of which were laying hens. France is the leader among the European Union countries in the organic poultry sector (there are more than 13 million heads, 30 % of which are laying hens). During the period of 10 years (2005–2015), the annual growth rate of organic poultry production in the European Union was recorded at 14 % (Fig. 4).

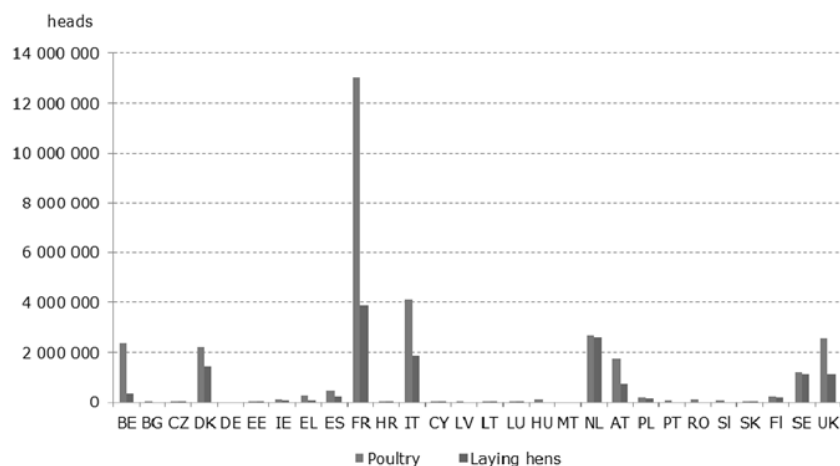


Figure 4. Number of organic bird heads in the European Union by region [2]

The forecasts for 2027 predict that the probable volume of poultry meat production in the European Union will reach 20 million tons, which is 11.3 % higher than in 2015. Figure 5 illustrates the estimated value of poultry meat production in the EU.

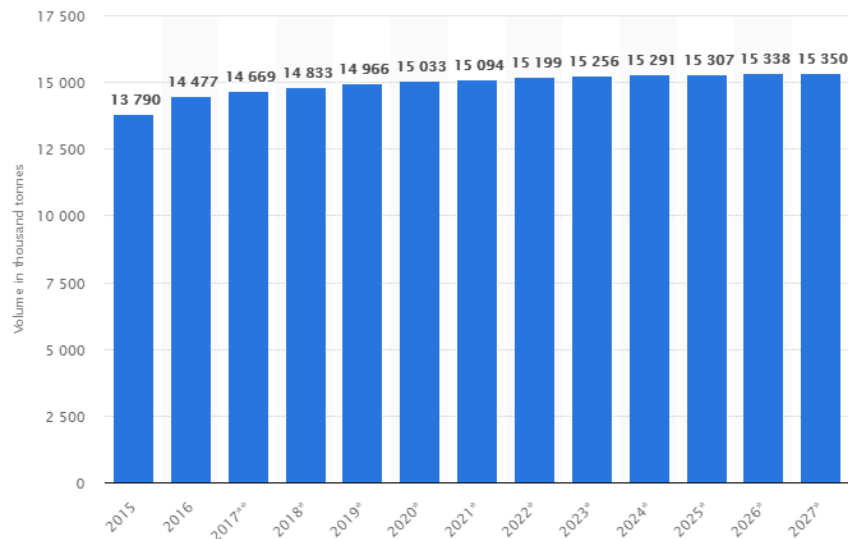


Figure 5. The forecast for poultry meat production in the EU

In recent years, the poultry industry in Ukraine is dynamically developing. Production and consumer demand grow annually. In the EU the organic chicken eggs market is growing. Thus, in Switzerland organic eggs market is about 20 %, and in Germany, France, and Austria it is more than 10 %. Organic meat takes small market shares because of the high markup across producers [4, 5].

Today, Ukraine ranks 10<sup>th</sup> in the world (1,007 million tons) chicken egg production. The highest level of chicken eggs production in Ukraine was recorded in 2013; it ranked 8<sup>th</sup> in the world ranking [11]. At the same time, organic poultry farming in Ukraine appears only a few years ago. Tatiana Yablonskaya was the pioneer. In 2009 she created a mini egg-laying farm, and in a three-year transitional period, received an organic certificate. LLC “Lybid-K” supplies organic eggs to supermarkets in Kyiv under the trade mark “World Bio” [6].

Before assessing the potential for the development of domestic organic poultry, it is necessary to highlight the main issues, the answers to which will help to better understand its content and features (Fig. 6).

The researches prove that organic eggs and poultry meat are more nutritious and healthy than conventional products. In conventional poultry farming chickens are kept in cages, thus the birds lack air and natural feedstuffs. The research from Pennsylvania State University showed that organic chicken eggs are higher in Omega-3 fatty acids, as well as in vitamins A and E [7]. Organic poultry farming is useful not only for human health but also for

ecosystems. Organic poultry farming is based on a harmonious relationship with the land, plants and animals, guided by the physiological and psychological animal needs.

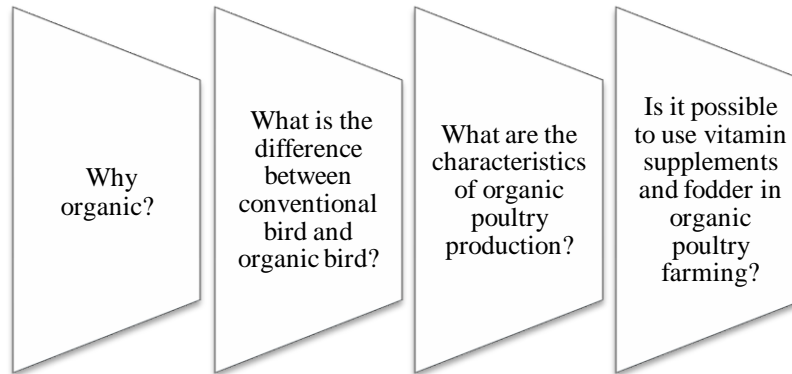


Figure 6. The main components of organic poultry farming

The development of organic poultry requires a deeper analysis of organizational peculiarities of such production. So, the main difference between organic and conventional birds is that organic birds have free access to grazing fields and are fed only with organic feedstuff without any additives or growth promoters. If birds are kept differently, it is already a conventional table bird production. The main goal of the giant poultry producers is to get meat and eggs as quickly and cheaply as possible. The poultry farms hold a few thousands of hybrid birds for high meat and eggs yields. Chickens are kept in cages and have no access to fresh air and grazing fields. The birds are fed only with grain high in fat and growth hormones, which accelerate birds' growth. In the case of the disease, antibiotics and medicines are used for rapid recovery. Such conditions do not meet any sanitary requirements, and requirements for humane treatment of animals. In industrial farms, the conventional method is used specially to meet the financial needs of the company. In this case the quality of products and consumers' health is not considered.

The main feature of organic poultry farming is to bring birds closer to the natural life conditions. The main factor of such conditions is grazing and organic feeding. If the farm wants to use organic feedstuff, it should certify its land as organic, and then all products grown on it (vegetables, fruits, cereals, forage crops) are considered organic and can be used in organic livestock breeding. Organic certification requires a serious responsibility from the producer. The producer is prohibited to use herbicides, pesticides and chemical fertilizers. Additionally, organic standards prohibit the use of GMOs.

Thus, rearing an organic bird without its own forage base is possible, but more difficult and more expensive. However, in Ukraine every year the share of certified lands increases, so the problem of finding a reliable supplier of organic feeds disappears over time. Thus, the area of certified agricultural land in Ukraine for various organic products is already more than 400 thousand hectares, and our country holds the honorable twentieth place among the world leaders of the organic movement. The organic share of agricultural land in Ukraine is about 1 % of the total farmland. At the same time, Ukraine is the first in the certified area of organic

arable land in the Eastern Europe, specializing mainly in the production of cereals, leguminous plants and oilseeds.

Official IFOAM statistical surveys reported 31 organic farms in Ukraine in 2002, while in 2017 there were 375 organic farms, and the total area of agricultural land for organic production was 420 thousand hectares. Figure 7 presents the organic farms growth dynamics.

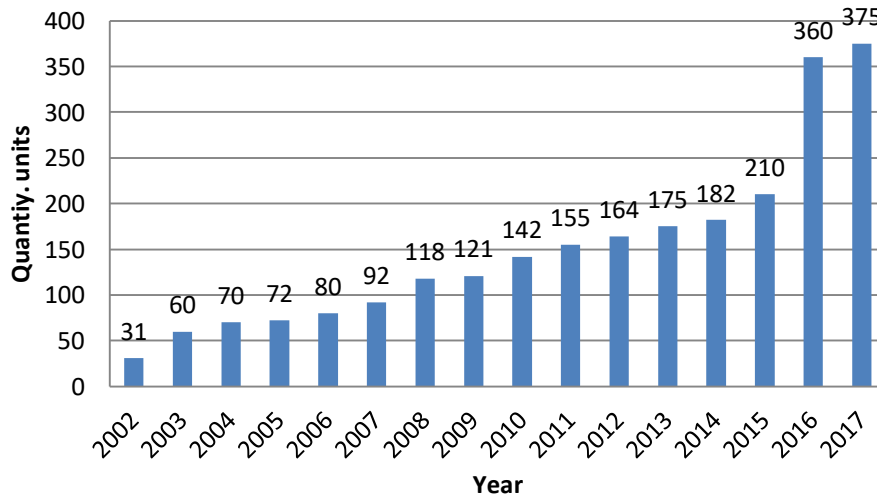


Figure 7. Number of certified organic farms in Ukraine [8, 10]

Most of Ukrainian organic farms are located in Odessa, Kherson, Kyiv, Poltava, Vinnytsia, Zakarpattia, Lviv, Ternopil, and Zhytomyr Regions. The size of the organic farms is different – from several hectares, as in most European countries, to several thousand hectares of arable land (Fig. 8) [8, 9].

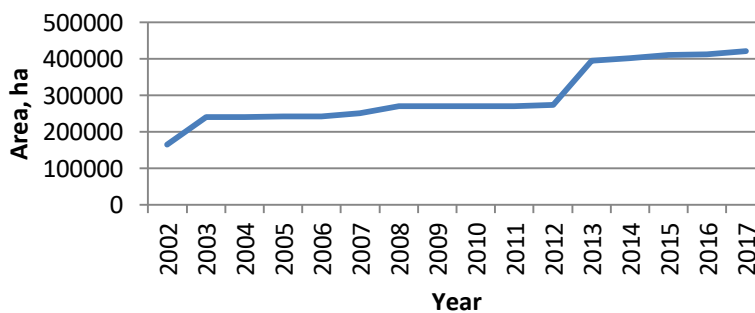


Figure 8. Growth dynamics of certified agricultural lands in Ukraine

Thus, it is possible to formulate the basic requirements for organic poultry farming: organically-reared chickens; certified organic feeds; the conditions for bird keeping must comply with sanitary norms and standards; bans for feed-additive antibiotics, growth stimulators, hormones, GMOs, etc.

The analysis of European tendencies and peculiarities of domestic organic poultry farming development allowed formulating the main development constraints of the industry.

1. Low buying power of Ukraine's population. Thus, the cost of organic products is significantly higher than non-organic; therefore, the majority of the population of Ukraine cannot buy organic products.

2. Low consumer awareness. "Organic poultry" market is shared with "home farm poultry" market. The end user, in most cases, is not sufficiently informed, and does not understand the difference between these concepts. Consumers do not understand the difference between organic products and non-organic products. Therefore, the growth of the organic poultry industry must be accompanied by information campaigns.

3. Labor-intensive certification process. The certification procedure is time consuming. To begin with, it takes three years for the so-called land transition period, then the chickens kept on this land must be certified, and only when first eggs appear, an organic producer and final products receive the organic status.

4. Chicken age is a significant constraint in organic poultry farming. Earlier it was allowed to take a 3 month-old hen, and in three months it started to lay eggs. Today, according to the rules a three day-old chicken should be bought as a layer.

Thus, it takes six months from purchasing of chicks to laying the first eggs, which means direct losses and significant influences on the entrepreneurs' interest in this industry.

However, despite these constraints, the future of organic poultry farming is promising. This speaks for the development potential of the whole agricultural sector.

First, the organic production is twice and a half more labor intensive than conventional agricultural production. In Ukraine the enterprises need five times more employees as the level of technical equipment is much lower.

Second, small households may become potential organic producers.

**Conclusions.** The research concludes that the organic sector in Ukraine has been taking a rapid development during the last 15 years. The poultry industry remains one of the main suppliers of food products, but organic poultry farming is at the level of "origin". The study distinguishes the main constraints and prospects for Ukraine's significant potential in organic industry development. In order to stimulate the rural population to produce certified organic products, it is necessary to use a system of state incentive methods. At the same time, it is necessary to stimulate not only organic products export, but also organic market development in Ukraine.

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*Manuscript received 2 October 2018*

**Развитие зеленых технологий в агропромышленном комплексе:  
опыт ЕС и перспективы для Украины**

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Сьогодні сучасною тенденцією в світовому агропромисловому комплексі є розвиток виробництва органічного сільськогосподарського господарства шляхом впровадження «зелених» технологій в землеробстві, тваринництві, птицеводстві тощо. Стаття присвячена дослідженню стану органічного птицеводства і визначає його майбутні перспективи розвитку для України. Проаналізовані індикатори світового виробництва органічних продуктів, масштаби світового ринку органічних продуктів показують стабільні тенденції в розвитку органічного виробництва. Автори проаналізували основні переваги світового органічного виробництва і підкреслили їх економічні, екологічні і соціальні аспекти. Аналіз поточної ситуації в Україні дозволяє зробити висновок, що ринок органічних продуктів в цілому представлений місцевими виробниками, які не завжди сертифіковані, але фактично працюють відповідно до органічних стандартів. Ці виробники можуть стати основою для формування «органічного» ринку, і їхній досвід може допомогти в розвитку цієї галузі. Крім того, в статті обговорені основні перспективи розвитку птицеводства в Україні і визначені основні вимоги до органічного птицеводства.

*Ключові слова:* органічне сільське господарство, органічне виробництво, вигода, птицеводство, сертифікація, потенціал.

*Mechanism of Economic Regulation*, 2018, No 4, 9–20  
ISSN 1726-8699 (print)

**Розвиток зелених технологій в агропромисловому комплексі:  
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Сьогодні сучасною тенденцією у світовому сільськогосподарському комплексі є розвиток виробництва органічного сільського господарства шляхом впровадження «зелених» технологій в землеробство, тваринництво, птахівництво тощо. У статті розглядається стан органічного птахівництва та визначаються його майбутні перспективи розвитку для України. Проаналізована світова частка органічних виробників, масштабність світового ринку органічних продуктів, демонструють значні тенденції на шляху розвитку органічного виробництва. Автори проаналізували основні переваги світового органічного виробництва та акцентували на їх економічних, екологічних та соціальних аспектах. Аналіз нинішньої ситуації в Україні дозволяє зробити висновок, що ринок органічного продукту в цілому представлений місцевими виробниками, які не завжди сертифіковані, але фактично діють відповідно до органічних стандартів. Ці виробники можуть стати основою для формування «органічного» ринку, і їх досвід може допомогти розвинути цю галузь. Крім того, у статті окреслено основні перспективи розвитку птахівництва в Україні та визначено основні вимоги до органічного птахівництва.

*Ключові слова:* органічне сільське господарство, органічне виробництво, вигода, птахівництво, сертифікація, потенціал.

*JEL Codes:* O130, Q120, Q240

*Figures:* 8; *References:* 12

*Language of the article:* English

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