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SCENARIO FORECASTING OF CONSUMPTION OF MAIN ORGANIC LIVESTOCK PRODUCTS IN UKRAINE

Purpose. *The aim of the article is to develop scenarios of consumption of the main types of organic livestock products in Ukraine. These scenarios should include the creation of an effective institutional environment aimed not only at strict quality control, but also at stimulating the modernization of production, the implementation of environmentally friendly technologies and genetic technologies for the production of safe products.*

Methodology / approach. *The methodological basis of the study is an integrated (systemic) approach, which allows forecasting more accurately the reproduction of the processes of quality supply of organic livestock products, taking into account the factors that affect it. Methodological aspects of calculations in forecasting the capacity of new segments of the organic market (which replace the market segments of traditional or mass products) are based on criteria of rational consumption, taking into account the influence of such factors: potential of organic livestock production in Ukraine, number of households (consumers), income of households (consumers), differentiation of household incomes (consumers), prices for organic livestock products, prices for livestock products originating from the traditional (mass) sector, consumer confidence in the quality assurance system for livestock products (including state quality control systems), consumer confidence in the organic certification system of livestock products.*

Results. *The main factors influencing the consumption of organic livestock products in Ukraine are identified, among which the main ones are the price and quality of products. The reasons of low rates of production of livestock products development with protected geographical names and organic products in Ukraine are described. In particular, it is substantiated that due to the high cost, complexity of production technologies, high cost of certification, the long transition period to organic production, the production of organic livestock products does not reach potential.*

Originality / scientific novelty. *The forecasting of the capacity of the organic sector is made under the conditions of partial or complex implementation of measures aimed at improving the quality of livestock products with the definition of inertial, innovative and systemic scenarios. The authors identified the system scenario as a priority. According to the systemic variant in Ukraine for the period up to 2025 the forecasted capacity of the internal market for organic meat and meat products (in terms of meat) will amount to 3.26 bln UAH; organic milk, dairy products and butter (in terms of milk) will amount to 2.65 bln UAH; organic eggs will amount to 0.47 bln UAH. In general, the market potential capacity of the main types of organic livestock products (at prices in 2019) will be 6.38 bln UAH (0.2 bln Euro) or 151.9 UAH (4.9 Euro) per one person. This is much less than the current European figure of 50 euros per person. In the potential consumer market, the share of organic livestock products in accordance with the systemic version of the solution of the quality problem will be from 1.6 % (meat and meat products) and 1.5 % (milk and dairy products)*

to 2.3 % (eggs), which is much lower than European indicators.

Practical value / implications. *Scenario forecasting of the dynamics of potential demand for organic livestock products allows understanding the pace of development of the domestic market of organic products, justification of measures and tools to stimulate domestic organic production, determining the impact of these measures on the capacity of the organic market. Otherwise, a significant market share of organic livestock products and food products of animal origin, including milk and dairy products, will be filled by imported products of European producers. The authors identified as a priority systemic scenario for the development of consumption of the main types of organic livestock products in Ukraine.*

Key words: *organic agricultural products, organic products market, animal husbandry, scenario forecasting, market capacity.*

Introduction and review of literature. Product quality is one of the global determinants of competitiveness, which determines the formation of an international value added chain. Agricultural products account for about 40 % of Ukraine's exports, therefore increasing the share of products with high added value is relevant. Such opportunities are associated with the development of the organic products market, the use of trademarks and geographical names, and the growth of product quality. The development of effective organizational and economic decisions based on the use of modern European experience can be the key to solve the acute problem of ensuring the quality and safety of livestock products in Ukraine.

Issues of development of the market of organic livestock products are actively considered in the scientific literature. Features of consumer behavior and demand factors are studied in the works of D. Taddesse [1], J. D. Jensen, T. Christensen, S. Denver, K. Ditlevsen, J. Lassen, R. Teuber [2], J. E. Hermansen [3]. In particular, the authors conducted research in national economies on consumer perception of organic product characteristics, including basic and additional characteristics, prices, product quality, product labeling, product innovation, place of production and product range in the market.

The analysis of changes in the production of organic livestock products and supply factors was carried out by Z. Sazvar, M. Rahmani, K. Govindan [4], E. Röös, B. Bajzelj, Ch. Weil, E. Andersson, D. Bossio, L. J. Gordon [5], N. Demir, S. Canan, O. Demir, A. Aksoy [6], F. Meng, Yu. Qiao, W. Wu, P. Smith, S. Scott [7]. The authors substantiated the influence of various factors on the cost and price of organic livestock products, considered ways to improve the quality and productivity of these products.

Peculiarities of the institutional environment of the market of organic agricultural products, factors of efficiency of its state regulation are considered in works of P. Niederle, A. Loconto, S. Lemeilleur, C. Dorville [8], T. Garnett, M. C. Appleby, A. Balmford, I. J. Bateman, T. G. Benton, P. Bloomer, J. Godfray [9]. These works defined the criteria for the effectiveness of state regulation of the organic sector of agriculture.

Foreign scientists constantly review the factors of demand and supply of organic livestock products, role of production organic products in formation “green

economy". These issues were considered in studies of T. J. Ashaolu, J. O. Ashaolu [10], X. Yu, L. Guo, G. Jiang, Y. Song, M. Muminov [11]. A number of important aspects related to the interrelated issues of food security and environmental protection, the role of organic production was revealed in scientific works.

The works of groups of scientists who combine the solution of the problem of food security with the need to preserve biodiversity on the planet and strengthen biological control, improve technologies based on the new "green revolution", the development of organic agriculture should be highlighted [12–16]. The analysis of the mentioned recent research justifies the necessity of the complex approach to substantiation of innovative decisions and models of sustainable food supply of the countries and development of organic production.

Ukrainian researches R. Bezus [17] and E. Gavaza [18] devoted their studies to the development of the market of organic agricultural products in Ukraine and the growth of its capacity.

However, the market capacity of organic livestock products in Ukraine remains insignificant. The share of organic products in the market of livestock products is about 1 %. Currently, there are no comprehensive studies on the rationale for tools to increase the capacity of organic livestock products in Ukraine, as well as scenario approaches to forecasting the impact of certain tools on the capacity of this market. In our previous studies [19–21] we have substantiated a number of tools to increase the market capacity of organic livestock products in Ukraine. In this study, we will focus on scenario approaches to forecasting the capacity of this market in conditions of market instability, low incomes of most households in Ukraine and the chaotic nature of government regulation.

The purpose of the article is to develop scenarios for the development of the market of organic livestock products in Ukraine.

Materials and methods. The methodological basis of the study is based on an integrated (systemic) approach, which allows forecasting more accurately the reproduction of the processes of quality supply of organic livestock products, taking into account the factors that affect it.

The scenario forecasting was preceded by a study of key factors of market capacity of high-quality livestock products in Ukraine, in particular, organic products. The results of these research were published in our previous works [19–23].

To build scenarios, we have identified the following factors of socio-economic nature that significantly affect the market capacity of organic livestock products in Ukraine: the potential for production of organic livestock products in Ukraine, the number of households (consumers), household income (consumers), differentiation of household income (consumers), prices for organic livestock products, prices for livestock products originating from the traditional (mass) sector, consumer confidence in the system of quality assurance of livestock products (in particular, the system of state quality control), consumer confidence in the system of certification of organic livestock products.

The coefficients of elasticity of demand for income, calculated on the basis of

the data for 19 years, were used to identify the differentiation of consumer incomes in Ukraine. All Ukrainian households were divided into decile groups according to the level of their monthly average per person total income. The first (lower) decile group unites 10 % of the lowest income households, the tenth (higher) decile group unites 10 % of the highest income households. The other eight decile groups combine households with incomes lower than those in households in the tenth decile group and higher than in households in the first decile group.

This division was based on the grouping of Ukrainian households by income level. For this purpose, we used the data of annual sample surveys of living conditions of households in Ukraine, which are carried out by specialists of the State Statistics Service of Ukraine, in particular, the data of such surveys for 2017–2019. Surveys are conducted on an ongoing basis, based on generally accepted international standards and in line with the current socio-demographic and economic situation in Ukraine. Since 2007, in Ukraine, in inequality research there has been used the indicator of total income (cash income, considering the value of income from personal farms, as well as the amount of non-cash benefits and subsidies received from the state, benefits from relatives and others) as a criterion, as compared to the indicator of total costs, which was used in 1999–2006. The sample survey methodology considers standard sampling mistakes, the level of household participation in the surveys, and so on. The materials of the sample survey were distributed to the general population (all households in Ukraine) using a statistical weighing procedure. This methodology considers the recommendations of Eurostat on reporting on the quality of statistical products and is regulated by the Methodological provisions for the preparation of standard reports on the quality of state sample surveys of households (households), approved by the order of Governmental Statistics dd. 05.06.2008 № 178 (with amendments dd. 11.07.2016 No. 107) [24].

In addition, we studied the retail prices for organic livestock products of certified producers (agricultural enterprises “Galeks-Agro”, “Dacha”), as well as for livestock products originating from the traditional sector in the markets “Delikat”, “Velyka Kysheniya”, “Silpo” (“Lavka Tradytsiy”), “ECO-market”, “Goodwine”, “Natur Boutique” in Kyiv, Cherkasy, Dnipro. Materials were obtained as a result of field research (personal visits to markets), as well as materials from the sites of the market “Natur Boutique” and the online supermarket “Ecoclub”. The prices obtained as a result of field research were compared with the prices contained in official statistics, in particular in the report “The World of Organic Agriculture Statistics and Emerging Trends 2020” [25].

To determine the share of Ukrainian consumers willing to buy more expensive organic livestock products, were used the materials of consumer surveys in Dnipropetrovsk region, conducted by a group of researchers led by R. Bezus [17], as well as consumer surveys in Kyiv, conducted by a group of researchers “Institute of Agrarian economy” headed by E. Gavaza [18]. Expert surveys of specialists of the Ministry of Agrarian Policy and Food of Ukraine, the Federation of Organic

Movement of Ukraine, specialists of LLC "Organic Standard" – the only Ukrainian body for certification of organic production, recognized in the EU, were also conducted.

We have substantiated and formed inertial, innovative and systemic scenarios of filling the market of organic livestock products in Ukraine. The inertial scenario describes the continuation of existing trends in pumping up of organic market, the innovative scenario involves the formation of an effective system of state quality control, development of conformity assessment and accreditation, stimulating the supply of high-quality livestock products, systemic scenario includes innovative combined with effective demand stimulation, development of competitive environment, stimulating the export of organic livestock products. The proposed measures within each scenario are described more detailed in our works [19; 23].

A key prerequisite for the transition of domestic households to the consumption of a certain type of organic livestock products is their achievement of a rational consumption rate for this type of product. Potential consumers of organic livestock products are groups of households in which consumption is closest to rational norms, which is the basic and initial criterion for the possibility of transition from quantitative to qualitative changes in consumption. Thus, the methodical aspects of calculations in forecasting the capacity of new segments of the organic market (by which the market segments of traditional or mass products are replaced) are based on the criteria of rational consumption, as well as criteria for falsification of traditional and organic livestock products.

Results and discussion. To substantiate the parameters of increasing the capacity of the market for high-quality livestock products in Ukraine and the development of their consumption processes, we investigated the dependence of consumption volumes on the size of the average per capita incomes. The calculations show that there is a significant link between the level of average per capita income and consumption of animal food products in most of their species, except milk and dairy products. This means that income is one of the key factors determining the amount of their consumption. In turn, the main factor of unsatisfactory dynamics of consumption of milk and dairy products in Ukraine is a decrease in the volumes of whole milk production.

Based on the data analysis for 2000–2019, with a number of indicators, we calculated the coefficients of elasticity of demand for income (Table 1).

According to our calculations, the elasticity of demand for meat and meat products income is 0.33; eggs – 0.33; milk and dairy products – 0.02; fish and fish products – 0.15. It is known that with a certain wealth (according to Engel's law), the coefficient of income elasticity tends to decrease. Although even without taking into account some predicted decline in the coefficient of elasticity, we can say that, due to an inertial plan, in order to overcome the 33% lag in meat and meat products consumption from rational growth rates of real incomes, it should be 100.0 % (33/0.33). Under current trends (2000–2019 years), this will be achieved no earlier than 10.9 years (100.0/9.2). Even worse are forecasts, within the inertial plan, for

milk and dairy products (achievement of rational standards of food for only 15 years). This is particularly acute not only for the urban population, but also for the rural population, a significant part of which has low incomes.

Table 1

Dynamics of consumption of the main types of products of livestock and fish farming

Estimated positions		Meat and meat products	Milk and dairy products	Fish and fish products	Eggs
Average annual growth rate in 2000–2019 years[1]:					
raw material production		2.4%	–1.4%	–9.5%	3.6%
import		11.0%	6.6%	14.4%	6.1%
export		5.8%	–6.7%	–1.7%	48.2%
real average per capita income (ΔI)		9.2%			
Consumption per one person (ΔQ)	the whole population	3.0%	0.2%	1.4%	3.0%
	urban	3.2%	0.3%	1.4%	3.2%
	rural	2.9%	0.2%	1.2%	2.9%
The coefficient of elasticity of demand (the whole population) by income in 2000-2019 years[2]		0.33	0.02	0.15	0.33
Consumption in 2019 year, Kg per one person (for eggs – pieces)	urban	56.5	196.9	13.0	282
	rural	45.7	206.8	11.6	256
Consumption volumes in 2019 year per one person, % to rational norm	urban	71%	52%	65%	97%
	rural	57%	54%	58%	88%

Notes. [1] The average annual growth rate is calculated by the formula: $\sqrt[19]{\Delta x\ (2000-2019\ years)}$ (own calculations).

[2]The coefficient of elasticity of demand for income is calculated by the formula: $\frac{\Delta Q}{\Delta I}$

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine [26–28].

Moreover, measures aimed at improving the quality of these types of products, can lead to even greater unavailability of them, even more delay in achieving rational consumption, because they increase the cost. Accordingly, the capacity of the domestic livestock products market will remain low, and the production of high-quality products will focus on export operations. This will further aggravate the problems of guaranteeing food security of the country and the development of the intellectual potential of the nation.

Today, Ukrainians consume significantly less organic products than residents of EU countries. According to the report "The World of Organic Agriculture Statistics and Emerging Trends 2020" per capita, this figure is about 1 euro, while in the EU – 76 euros [29]. In terms of the volume of the domestic market of organic products, Ukraine ranks 25th in Europe: from a hectare of organic land, the domestic market receives products for 50 euros, while in Europe – for 2345 euros [30].

Despite a significant increase in the area of organic land in Ukraine (over the

past ten years, they have increased by 39 thsd. ha), the vast majority of these areas are occupied by arable crops [28]. According to Organic Standard LLC, the only Ukrainian accredited organic certification body (the other 16 accredited in Ukraine are foreign), out of 485 domestic entrepreneurs who have received a certificate of organic production, only 15 entrepreneurs or 3 % of their total number produce livestock products [31].

Information from the International Federation of Organic Agricultural Movements (IFOAM), filed in the collection "Organic Agriculture in the World 2018", shows disappointing statistics on the low share of organic livestock production in the global volumes of its world production. In particular, in Europe, the share of organic livestock production in the total volume of its production is as follows: the growth of bulls and young animals of cattle is 5.2 % (in Ukraine – about 1 %), sheep – 5.0 % (no subjects are certified in Ukraine), pigs – 0.7 % (in Ukraine – less than 1 %), poultry – 3.3 % (in Ukraine – less than 1 %), milk production – 3.4 % (in Ukraine – about 1 %) [30; 32].

Thus, both in Europe and in Ukraine, the share of organic livestock production is insignificant. In the EU, high quality livestock products are also associated with products with a "Protected Designation of Origin" (PDO), "Protected Geographical Identification" (PGI), and "Traditional Specialty Guaranteed" (TSG). According to researchers, of 1199 registered logos of quality assurance in the EU, 706 (59 %) are products of animal origin, of which 56 % are PDOs, 41 % are PGIs and 3 % are TSGs. Out of the 565th registered PDOs, almost 70 % are the names of the origin of livestock products [33].

However, proper conditions have not yet been created in Ukraine to stimulate the production of products with protected geographical identification. Huzul cow and sheep brynza, which are absolutely authentic products and are not produced anywhere else in the world, can become the first products with the geographical identification recognized in the EU. Soon, Huzul sheep brynza should be the first of Ukrainian products to be entered in the register of geographical indications for food in the EU. The recipe of this ecological and natural product dates back to the 15th century. Now the price of brynza is too low for such a high-quality product. Due to registration in the EU, domestic producers of products with the geographical indication will expand the markets and consumers will receive guaranteed quality. As an example is France, where after the labeling and registration of cheese "Laguiole" in a few years, the number of producers from a dozen reached 50, and the price of cheese increased by 10 times [29].

The reason for the low rates of development of livestock production with protected geographical names and organic products in Ukraine is, firstly, the high cost of procedures for the recognition, registration and certification, and secondly, the high net cost of such products, which, in conditions of low solvency of the population, is negatively reflected on its competitiveness in the domestic market. Eco-friendly and organic feeds are much more expensive, expensive maintenance of cattle without the use of chemical veterinary drugs, as well as the provision of

adequate level of freedom of movement of animals and free access to feeding areas and sources of drinking water.

We investigated the retail prices of organic products of animal origin of certified producers, in particular PC Galeks-Agro Company, FE Dacha Company, in domestic supermarkets ("Delicate", "Velyka Kushenya", "Silpo", "ECO-Market", "Goodwine", "Natur Boutique" in the cities of Kyiv, Cherkasy, Dnipro) and compared with prices for similar products of the traditional sector. The research showed that in Ukraine, for most dairy, meat products, eggs, the price difference is 180–200 % (taking into account counterfeit products, the price difference is even more). Such a correlation of prices is observed in the USA and EU countries [33]. In particular, for milk 2.5 % fat content, the difference in prices was 194–200 %, kefir 2.5 % fat content – 184–187 %, sour cream 21 % fat content – 187–189 %, butter – 72.5 % fat content – 160–173 %, chicken eggs – 260–283 %, boiled sausage – 168–200 %, sausages – 176–194 %. The results of these studies were published by us in the monograph "Organizational and economic solutions and models of improving the quality of livestock products in Ukraine" [23, p. 261].

Data from our field studies were compared with data from other studies. According to the scientific work of the NSC "Institute of Agrarian Economics" scientist E. Gavaza, in 2014 the difference in retail prices for traditional and organic livestock products was the same or even greater. Thus, organic chicken eggs were more expensive than their traditional counterparts by 60 %, fat by 50 %, milk by 2.2 times, pork (steak) by 2.8 times, chicken meat by 3.3 times, honey – 2.1 times [35].

A similar difference in prices was noted in numerous information reports of the Ministry of Economic Development, Trade and Agriculture of Ukraine (Ministry of Economy of Ukraine), representatives of the Swiss-Ukrainian program "Development of trade with higher added value in the organic and dairy sectors of Ukraine" (implemented by FiBL in partnership with SAFOSO AG, Switzerland), on the information portal Organic Info, on the sites of Organic Standard, GS "Organic Ukraine", information center "Green Dossier", etc. These organizations are recognized in Ukraine in the field of analytical research of organic production.

On the website of the Ministry of Economy of Ukraine (in the section "Organic production in Ukraine"), when presenting information messages is often a link to the well-known among domestic experts information portal Organic Info [36]. This information portal contains detailed information on prices for certified organic products of Ukrainian production in the context of a number of leading domestic supermarkets. When comparing the prices for certified organic dairy, meat products and eggs with the prices for similar products of the traditional sector, the same difference is obtained in 160–200 % [37].

It is obvious that in the EU the difference in prices for organic and traditional livestock products is smaller. After all, in the EU, due to the introduction of strict requirements for safety and product quality, most traditional livestock products are of high quality.

Therefore, the difference in quality, and as a consequence, in product prices, is not as significant as in Ukraine. This is confirmed by numerous studies [38–40]. In particular, in the Netherlands, the difference in prices for organic and inorganic eggs is 180 %, milk – 143 %, pork – 146 %, beef forcemeat – 187 % [40].

However, the results of research by foreign scientists should not be directly extrapolated to Ukrainian realities given the unsatisfactory trends in ensuring the safety and quality of livestock products in Ukraine. In Ukraine, there is a significant scale of falsification of livestock products, a large share of these products, which are traded on the market, contain banned chemicals, antibiotics, growth stimulants, etc. and are dangerous to human health. Counterfeit livestock products originating from the traditional sector are usually sold at low prices. This causes a significant difference in prices for organic and traditional products.

During August-September 2020, surveys were conducted in the EU and Ukraine, which, among other things, revealed the awareness and attitude of consumers to organic products. The study in the EU was conducted by Kantar at the request of the European Commission (Wave EB93.2). The study in Ukraine was conducted by M. Zhub for the association "Organic Initiative" with the financial support of Switzerland under the Swiss-Ukrainian program "Development of trade with higher added value in the organic and dairy sectors of Ukraine", implemented by the Research Institute of Organic Agriculture (FiBL, Switzerland) in partnership with SAFOSO AG (Switzerland). According to these studies, 91 % of EU residents and only 68 % of Ukrainians are aware of the need to overpay for organic products [41].

This means that Ukrainians faced with large-scale counterfeiting, do not trust the domestic system of product safety and quality control. On the other hand, the statement "If you do not want to harm your health, consume only organic" is quite common among Ukrainian consumers.

Taking into account the distrust of consumers to the domestic system of conformity assessment and low income, most of them are not ready to pay excessively for organic products yet. This is confirmed by the results of research conducted in the Dnipropetrovsk region by a group of scientists under the direction of R. Bezus. Only 2–5 % of respondents are willing to pay over 80 % of the value added (5 % of respondents for organic meat, 4 % for organic dairy products, 3 % for eggs) [17]. This is due to the fact that this region occupies one of the leading places in Ukraine in terms of socio-economic development (in the ranking of socio-economic development of regions by the end of 2017 – 4th place) [35].

Other studies have similar results regarding the specifics of consumer behavior on the market of domestic organic products of livestock breeding. In particular, E. Gavaza received similar data. The researcher noted that only 5 % of consumers are ready to buy organic meat and meat products at 75 % extra price and are ready to replace their traditional products, milk and cheese – 7 %, eggs – 8 % [35].

The households will remain the key segment of the domestic market for organic livestock products, which, by the level of average per capita incomes, are classified in the upper decile group (10 % of households with the highest incomes). This does not

mean that other consumers won't appear periodically on the market, who, for the sake of curiosity or supporting (at certain periods) a healthy lifestyle, will buy organic products. Such households should also include individual households with children of preschool age (up to 7 years of age), people with health problems and a constant awareness of the need to preserve the environment, etc. Although these consumers tend to form an occasional, irregular demand, which causes a slight increase in market capacity, they are among those 5–8 % of the country's population who are willing to pay more than 60 % extra price for organic livestock products.

We forecasted the capacity of the organic sector under the conditions of partial or complex implementation of measures aimed at improving the quality of livestock products, that is, within the inertial, innovative and systemic plans. From our point of view, the key prerequisite for the transition of domestic households to the consumption of a certain type of organic livestock products is the achievement of a rational consumption rate for this type of products. That is, potential consumers of organic products are groups of households in which consumption is most closely approximated with rational norms, which is the basic and initial criterion for the possibility of switching from quantitative changes in consumption to quality ones.

Now, according to the inertial plan, it primarily concerns households that are classified as the highest (tenth) decile group. However, in 2019 year, for most types of livestock products, rational consumption norms were not achieved even in these households (Table 2).

Table 2

Differentiation of the Ukrainian population by the level of consumption of food products of animal origin in 2019 year, kg per a person in a month

Decile (10 %) groups of households by monthly average per capita total income	Meat and meat products (in terms of meat)	Milk and dairy products and butter (in terms of milk)	Eggs, pcs
First (lower) decile group (4.2% of all cash income)	3.2	13.5	17
Tenth (higher) decile group (21.9% of all cash income)	6.3	24.5	23
All households	4.6	19.0	21
Rational monthly norm	6.9	36.5	24
Tenth decile group to first decile group, %	196.9	181.5	135.3
Tenth decile group to rational norm, %	91.3	67.1	95.8
All households to rational norm, %	66.7	52.1	87.5

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine [25–27].

Data in Table 2 testify, that domestic households belonging to the highest (tenth) decile group now consume meat and meat products by 91.3 % of rational norm, milk, dairy products and butter by 67.1 %. These households are closest to rational consumption norms. And they will form the basis of those 3–5 % of the population who, according to the above studies, are willing to overpay for organic products.

According to the minimum criterion of rational consumption, it is possible to

predict that a certain part of households of the highest decile group (about 30–35 % or 3.0–3.5 % of the population) are ready to switch to episodic consumption of organic livestock products. We are talking, firstly, only about the part of households in the upper decile group with the highest incomes (the level of their income allows them to consume organic products); secondly, not about the complete transition to the consumption of organic products, but about its occasional consumption by some households of the upper decile group.

It should be emphasized that the criterion of consumption rationality, fixing the objectively formed state of affairs with the achievement of rational norms of consumption in households of the upper decile group, comprehensively reflects the influence of a number of factors: tastes and preferences of consumers), income (income in the upper decile group allows organic consumption), production volumes (due to the shortage of quality raw milk in Ukraine, a number of households of the upper decile group prefers imported organic dairy products, which are imported in sufficient quantities), the situation with conformity assessment products, state quality control, etc. Therefore, this criterion of consumption rationality is one of the main in forecasting the possibilities of organic consumption.

Within the inertial plan, according to the criteria of rational consumption, potential production opportunities of a certain type, the level of counterfeiting of traditional products (shares on the market of dangerous products of the traditional sector), the forecast percentage or measure of replacement of organic products by its traditional counterpart for each type is chosen.

Expert surveys and a series of research have shown that for the households of the highest (tenth) decile group this percentage will not exceed: milk, dairy products and butter by 15 % (the market contains a lot of counterfeit products, so the consumer will not trust organic ones), meat and meat products by 20 % (this percentage is due primarily to consumers' confidence in the quality of organic beef and lamb), eggs by 15 % (organic chicken eggs are associated with consumers, primarily with eggs grown exclusively in homelands; consumers do not trust modern intensive technologies used in large poultry farms) [35].

Thus, we can forecast the share of organic milk, dairy products and butter in the total costs of the average Ukrainian for milk, dairy products and butter – 0.5 % (3.5 % of the population × 0.15), organic meat and meat products – 0.7 % (3.5 × 0.2), organic eggs – 0.5 % (3.5 × 0.15).

At the same time, recent studies in the Netherlands have shown that with less differentiation of prices for organic and traditional products, the cost of organic eggs was 3.8% of the cost of an individual average consumer to buy eggs (2.334 euros vs. 61.014 euros), the cost of organic milk – 4.1 %, the cost of organic pork – 1.6 % [36, p. 398].

Thus, even given the risks to human health from the consumption of traditional products in Ukraine, the degree of substitution of traditional products for organic products is much lower than in the EU.

Based on the above calculations and conclusions, it is possible to calculate the

approximate consumption of the main types of organic livestock products in Ukraine. The number of households classified in the upper decile group in 2019 was 1488.2 thsd.; their average equivalent size was 2.12 people; the estimated percentage of these households ready to switch to occasional consumption of organic livestock products is 35 %. Thus, we get a potential market segment of organic livestock products by inertial option – 1.1 mln people (1488.2 thsd. units × 2.12 people × 0.35) in the decile group with the highest level of consumption (or about 5 %) population of Ukraine as of 01.01.2020).

In the line with the innovative plan of ensuring the quality of livestock products, the implementation of which will result in increased requirements for its safety, the organic sector will experience greater competition from those of the traditional sector that offer safer products. Increasing competition will lead to a reduction in prices for organic products and, consequently, to increase its availability for individual households.

At the same time, this will not lead to a significant increase in the consumption of organic livestock products. After all, the demand for organic products is inelastic in price. In the EU, large-scale experiments with lower prices for organic products did not lead to a significant increase in demand and the achievement of the target indicator of market share of organic products at 5–7 % of total market capacity. A significant role in the consumption of organic products is played by the availability of educational activities among the population, their awareness of the need to maintain animal welfare and preserve the environment, the development of the infrastructure of the organic products market and so on.

Thus, within the innovation scenario, the projected percentage or approximate degree of replacement of its traditional analogue in milk, dairy products and butter by organic products will not exceed 20 % (there will be many dangerous and counterfeit dairy products on the market, which will inspire consumers buy organic products), for meat and meat products – 25 %, table eggs – 20 %. Such figures will be possible only due to the achievement by households of the upper decile group of rational nutrition standards for all major livestock products except milk. Thus, under the innovative option, the key segment of the market of organic products will remain virtually unchanged (households of the upper decile group), but its consumption will increase slightly.

The above-mentioned substitution parameters in the upper decile group of households will be achieved also in the systemic plan of ensuring the quality of livestock products (the criterion of rational consumption will remain a key one). In addition to these households, according to the systemic version, the segment of the organic products market will also include households with children up to seven years old (3.1 mln people), some of whom will become consumers of organic products (especially some households in the 6–9 decile groups – about 0.4 mln people), as well as people who want to lead a healthy lifestyle (not vegetarians) and are aware of the need to preserve the environment – about 0.2 mln people (about 1 % of household members of the sixth to ninth decile groups).

The indicated households, according to inertial and innovative options, do not have sufficient financial means to switch to organic products consumption. At the same time, with the implementation of a number of measures proposed by us in the author's version of the organizational and economic mechanism for improving the quality of livestock products, a systemic option for the development of the market for high-quality livestock products is possible, which modifies the forecast of the capacity of the organic products market. By updating this version of the forecast, the capacity of the organic products market will increase due to the coverage of its new segments. The set of necessary measures within the implementation of the system version of ensuring the quality of livestock products is revealed by us in the author's monograph "Organizational and economic solutions and models for improving the quality of livestock products in Ukraine" [23].

Methodological aspects of calculations when forecasting the capacity of new segments of the market within the system version are also based on the criteria outlined above (rationality of consumption, production potential, level of falsification of traditional products, etc.). Since households with children under seven years old classified as 1–9 decile groups will not be provided with rational consumption standards for the main types of food products of animal origin, the measure of replacement of traditional products by the organic sector with regard to milk, dairy products and butter will not exceed 15 %, meat and meat products will not exceed 20 %, eggs will not exceed 15 %. The same parameters of substitution by traditional organic products will be relevant to the household members of 6–9 decile groups that lead a healthy lifestyle (but not vegetarians) and will have certain financial opportunities for this.

On the basis of the obtained objective data, we calculated natural indicators, in particular, the potential volumes of consumption of a certain type of organic livestock products for the period up to 2025 by inertial, innovative and systemic variants (Table 3–5).

The data in Table 3 show that, according to the inertia variant in Ukraine for the period up to 2025, the forecasted capacity of the internal market for organic meat and meat products (in terms of meat) will be 16.6 thsd. tons or less 1% of the total capacity the consumer market of this type of products (market of traditional, organic and genetically modified products); organic milk, dairy products and butter (in terms of milk) will be 48.5 thsd. tons (less than 1% of the capacity of the consumer market of this type of products); organic eggs will be 45.5 million units or 5.3 thsd. tons (less than 1% of the capacity of the consumer market of this type of products).

According to the innovative option in Ukraine for the period up to 2025, the forecasted capacity of the internal market for organic meat and meat products (in terms of meat) will be 20.8 thsd. tons or about 1 % of the capacity of the consumer market for this type of products (the market for traditional, organic and genetically modified products); organic milk, dairy products and butter (in terms of milk) will be 64.7 thsd. tons (about 1 % of the capacity of the consumer market of this type of products); organic eggs will be 60.7 mln pieces (about 1 % of the capacity of the

consumer market of this type of products) – Table 4.

Table 3

Potential consumption of organic livestock products in Ukraine by its types for the period up to 2025 year (inertial plan)

Parameters of consumption	Type of products		
	Meat and meat products (in terms of meat)	Milk, dairy products and butter (in terms of milk)	Eggs, pcs
Actual consumption of traditional products per one person in 2019 within the upper decile group of households, kg/year	75.6	294.0	276.0
Approximate measure of replacement of traditional organic products in households of the highest decile group, ready to switch to organic consumption, %	20.0	15.0	15.0
Potential consumption of organic products per one person within the upper decile group of households, kg/year	15.1	44.1	41.4
Potential annual consumption of organic products within the upper decile group of households (1.1 mln people), thsd. tons	16.6	48.5	45.5

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine [25–27].

Due to the innovative variant, the capacity of the domestic market for organic livestock products will remain below the European average figures by 2025.

Table 4

Potential consumption of organic livestock products in Ukraine by its types for the period up to 2025 year (innovative plan)

Parameters of consumption	Type of products		
	Meat and meat products (in terms of meat)	Milk, dairy products and butter (in terms of milk)	Eggs, pcs
Actual consumption of traditional products per one person in 2019 within the upper decile group of households, kg/year	75.6	294.0	276.0
Approximate measure of replacement of traditional organic products in households of the highest decile group, ready to switch to organic consumption, %	25.0	20.0	20.0
Potential consumption of organic products per one person within the upper decile group of households, kg/year	18.9	58.8	55.2
Potential annual consumption of organic products within the upper decile group of households (1.1 mln people), thsd. tons	20.8	64.7	60.7

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine [25–27].

As a result of implementation of a number of measures within different directions of the author's model of the organizational and economic mechanism for raising the quality of livestock products (in particular, within the directions "Creating conditions for stimulating demand for high-quality livestock products", "Protection and development of competition in the market of high-quality products" [23], "Development of the pricing system for livestock products, taking into account the factor of quality", "Development of the infrastructure of the market for high-quality products and cooperative movement"), revealed by the authors in the monographs "Organizational and economic solutions and models for improving the quality of livestock products in Ukraine" [23], physical parameters of the capacity of the internal market and certain types of organic livestock products by 2025 may be as follows: meat and meat products (in terms of meat) will be 27.2 thsd. tons; milk, dairy products and butter (in terms of milk) will be 82.8 thsd. tons; organic eggs will be 85.9 mln pieces (Table 5).

Table 5

Potential consumption of organic livestock products in Ukraine by its types for the period up to 2025 year (system plan)

Parameters of consumption	Type of products		
	Meat and meat products (in terms of meat)	Milk, dairy products and butter (in terms of milk)	Eggs, pcs
1. Potential annual consumption of organic products within the upper decile group of households (1.1 mln people), thsd. tons	20.8	64.7	60.7
2.1. Actual consumption of traditional products per one person in 2019 within households with children under 7 years of age and in households with healthy lifestyles (non-vegetarians), kg/year*	53.6	200.5	282.0
2.2. Approximate measure of replacement of traditional organic products in households according to item 2.1 of this table, %	20.0	15.0	15.0
2.3. Potential consumption of organic products per one person within households from paragraph 2.1 of this table, kg/year	10.7	30.1	42.0
2.4. Potential annual consumption of organic products within households from paragraph 2.1 of this table (0.4 mln people + 0.2 mln people), thsd. tons	6.4	18.1	25.2
Together, the potential annual volumes of consumption of organic products (market capacity of organic products) (line 1 + line 2.4), thsd. tons	27.2	82.8	85.9

Note. *Actual consumption is taken at the level of all domestic households.

Source: calculated by the authors according to the data of the State Statistics Service of Ukraine [25–27].

We determined the potential capacity of the domestic market for certain types of organic livestock products based on its consumption volumes, actual prices as of

01.08.2019, as well as the share of organic products market in the common market (market of traditional, organic and genetically modified products) (Table 6).

Table 6

Potential capacity of organic food products market in Ukraine for the period up to 2025, together with the type of products (at prices in 2019)

Variants or plans for implementation of the model of organizational and economic mechanism for improving the quality of livestock products	Potential capacity of the market for certain types of organic livestock products, bln UAH			Total the potential capacity of the organic market for the main types of livestock products, bln UAH
	Meat and meat products (in terms of meat)	Milk, dairy products and butter (in terms of milk)	Eggs	
Inertial pan	1.99	1.55	0.25	3.79
Innovative plan	2.50	2.07	0.34	4.91
Systemic plan	3.26	2.65	0.47	6.38

Source: formed by the authors.

As the potential annual consumption of animal food products is based on the main types of livestock products (milk, meat), the actual prices for organic milk (32 UAH/l), meat (average weighted the price of organic beef, pork and chicken is about 120 UAH/kg), eggs (55 UAH/10 pieces) were taken into consideration. Thus, the capacity of the market for organic livestock products for the period up to 2025 is calculated by us in the prices of 2019.

In accordance with the systemic plan (defined by us as a priority) in Ukraine for the period up to 2025 the forecasted capacity of the internal market for organic meat and meat products (in terms of meat) will amount to 3.26 bln UAH; organic milk, dairy products and butter (in terms of milk) will amount to 2.65 bln UAH; organic eggs will amount to 0.47 bln UAH. In general, the market potential capacity of the main types of organic livestock products (at constant prices in 2019) will be 6.38 bln UAH (0.2 bln Euro) or 151.9 UAH (4.9 Euro) per one person. Such indicators will remain much lower than the European ones.

We have calculated the share of organic products in the total volumes of potential consumption of the main types of livestock products in Ukraine for the period up to 2025. The basis of the calculations is the estimated cost of real consumption of the main types of livestock products in 2019, as well as the forecast of changes in the population of the country and the volume of the consumption of the main types of livestock products by 2025.

Data on market value of consumption capacity of the main types of livestock products also include market assessments of products grown and consumed directly within the households themselves, that is, they did not enter into market turnover. In general, domestic consumption of the main types of livestock products in 2019 was at the level of 326.3 bln UAH.

In the potential consumer market, the share of organic livestock products according to the systemic variant of solving the quality problem will range from 4.3 % (meat and meat products) and 4.5 % (milk and dairy products) to 7.2 % (eggs). According to the systemic version, the share of the domestic market of organic

livestock products in its total volumes by 2025 will approach the general European indicators.

The proposed system changes in the quality area, in contrast to the innovation variant, directly affect also households that are less susceptible to huge investment and innovation, and in the livestock sector, which has been stagnating in recent years. The implementation of systemic changes will stimulate demand for important types of traditional products of animal origin of high quality produced by them (meat, eggs, honey), will help to protect the competitive environment on the market, their association into marketing co-operatives and transformation into small and medium-sized farms, improving access to state support tools and infrastructure components.

In contrast to the currently formed dual subjective structure of the market for traditional livestock products (on the one hand households, on the other – large agricultural holdings that are granted by the state support), our suggestions are aimed at forming such a structure of production of high quality products (in particular, organic), which would be based on small, medium and moderately large production, which is expedient in terms of ensuring the welfare of animals, their free running, guaranteeing the high quality of products, the content in it useful organic substances of natural origin, saving biodiversity, the environment, restoring ecosystems and soil fertility, increase rural employment and social problems in rural areas. This will create the preconditions for ensuring sustainable development of the country, political stability, socio-demographic integrity of society and accumulation of human capital.

In the long opportunity (after 2025) of the development of the market conditions for high-quality livestock products will have an impact on institutional, structural and global competitiveness factors: integration processes and the development of transnational corporations; expansion or extinction of military conflicts; migration processes; appearance of inventions and development of innovative technologies in the field of genetic modification of livestock products; increasing consumer awareness in the field of modern biotechnology; changes of traditions, customs, culture of consumption of products of the traditional and biotechnological sectors; changes in the nutrition structure of the population in the direction of refusing to consume red meat with high levels of hypodermic and intramuscular fat (in particular, pork); level of social and economic development of Ukraine; economic conditions of functioning of domestic agroindustrial complex; educational and qualification level of the rural population; the level of corruption in the country and the possibility of rent-oriented behavior of officials; introduction or non-introduction of a full-value land market in Ukraine.

Conclusions. In Ukraine, the urgent task of transition of livestock production to an innovative type of development needs to be decided, which means, first of all, the creation of an effective institutional environment aimed not only to a strict quality control, but also in stimulating the modernization of production, the implementation of environmentally friendly technologies and genetic technologies for the production of safe products. Along with the stimulation of intensification processes, it is necessary to plan organizational and economic measures aimed at stimulating the

development of organic production, initiatives for the protection of animal rights.

Given the current trends of economic thinking of the population of Ukraine, its perception of products of different sectors (traditional, biotechnological and organic), established traditions of consumption, for domestic consumers we can forecast the maximization of the beneficial effect of purchasing and consuming organic products. The author's approach to forecasting the market capacity of livestock products (originating from the traditional, organic and biotechnological sectors) is based on a comprehensive approach that provides a rational ratio of the following elements: resources – effect – quality of life – environment.

Due to the probability of a comprehensive implementation of the measures proposed by us within the author's model of the organizational and economic mechanism for improving the quality of livestock products, the volatility of the state regulation instruments is expedient to have a variant approach to forecasting the consequences of such measures in terms of the development of market conditions. According to the systemic variant (defined by us as a priority) in Ukraine for the period up to 2025 the forecasted capacity of the internal market for organic meat and meat products (in terms of meat) will amount to 3.26 bln UAH; organic milk, dairy products and butter (in terms of milk) will amount to 2.65 bln UAH; organic eggs will amount to 0.47 bln UAH. In general, the market potential capacity of the main types of organic livestock products (at constant prices in 2019) will be 6.38 bln UAH (0.2 bln Euro) or 151.9 UAH (4.9 Euro) per one person. This is much less than the current European figure of 50 euros per person.

In the potential consumer market, the share of organic livestock products in accordance with the systemic version of the solution of the quality problem will be from 1.6 % (meat and meat products) and 1.5 % (milk and dairy products) to 2.3 % (eggs), which is much lower than European indicators.

Prospects for further research on the development of the organic livestock products market in Ukraine are to substantiate the tools of state assistance to increase the capacity of this market. Firstly, it is necessary to increase the availability of the system of organic certification for agricultural producers and expand the sources of financial resources, to actualize the benefits of the introduction of the land market. Secondly, it is important to work out measures to increase the effective demand of the population, to avoid mixing the flows of traditional and organic products in the retail network. Thirdly, it is necessary to strengthen state control over compliance with the quality of organic products on the market, avoid counterfeiting, which will increase consumer confidence in the system of ensuring the functioning of the market for organic products.

References

1. Taddesse, D. (2016), Organic livestock farming and the scenario in the developing countries: opportunities and challenges. *Global Veterinaria*, vol. 16, no. 4, pp. 399–412. https://doi.org/10.5829/idosi.gv.2016.16.04.10368.

2. Jensen, J. D., Christensen, T., Denver, S., Ditlevsen, K., Lassen, J. and Teuber, R. (2019), Heterogeneity in consumers' perceptions and demand for local

(organic) food products. *Food Quality and Preference*, vol. 73, pp. 255–265 https://doi.org/10.1016/j.foodqual.2018.11.002.

3. Hermansen, J. E. (2003), Organic livestock production systems and appropriate development in relation to public expectations. *Livestock Production Science*, vol. 80, is. 1–2, pp. 3–15. https://doi.org/10.1016/S0301-6226(02)00313-5.

4. Sazvar, Z., Rahmani, M. and Govindan, K. (2018), A sustainable supply chain for organic, conventional agro-food products: the role of demand substitution, climate change and public health. *Journal of Cleaner Production*, vol. 1941, pp. 564–583. https://doi.org/10.1016/j.jclepro.2018.04.118.

5. Röös, E., Bajzelj, B., Weil, Ch., Andersson, E., Bossio, D. and Gordon, L. J. (2021), Moving beyond organic – a food system approach to assessing sustainable and resilient farming. *Global Food Security*, vol. 28, 100487. https://doi.org/10.1016/j.gfs.2020.100487.

6. Demir, N., Canan, S., Demir, O. and Aksoy, A. (2016), Determining the factors affecting farmers' decision on organic livestock. *Turkish Journal of Agriculture – Food Science and Technology*, vol. 4, no. 4, pp. 313–317. https://doi.org/10.24925/turjaf.v4i4.313-317.573.

7. Meng, F., Qiao, Yu., Wu, W., Smith, P. and Scott, S. (2017), Environmental impacts and production performances of organic agriculture in China: a monetary valuation. *Journal of Environmental Management*, vol. 188, pp. 49–57. https://doi.org/10.1016/j.jenvman.2016.11.080.

8. Niederle, P., Loconto, A., Lemeilleur, S. and Dorville, C. (2020), Social movements and institutional change in organic food markets: evidence from participatory guarantee systems in Brazil and France. *Journal of Rural Studies*, vol. 78, pp. 282–291. https://doi.org/10.1016/j.jrurstud.2020.06.011.

9. Garnett, T., Appleby, M. C., Balmford, A., Bateman, I. J., Benton, T. G., Bloomer, P. and Godfray, H. C. J. (2013), Sustainable intensification in agriculture: premises and policies. *Science*, vol. 341, is. 6141, pp. 33–34. https://doi.org/10.1126/science.1234485.

10. Ashaolu, T. J. and Ashaolu, J. O. (2020), Perspectives on the trends, challenges and benefits of green, smart and organic (GSO) foods. *International Journal of Gastronomy and Food Science*, vol. 22, 100273. https://doi.org/10.1016/j.ijgfs.2020.100273.

11. Yu, X., Guo, L., Jiang, G., Song, Y., Muminov, M. (2018), Advances of organic products over conventional productions with respect to nutritional quality and food security. *Acta Ecologica Sinica*, vol. 38, is. 1, pp. 53–60 https://doi.org/10.1016/j.chnaes.2018.01.009.

12. Nelson, G. C., Rosegrant, M. W., Palazzo, A., Gray, I., Ingersoll, C., Robertson, R. and You, L. (2010), Food security, farming, and climate change to 2050: scenarios, results, policy options. IFPRI Research Monograph, International Food Policy Research Institute (IFPRI), Washington, D.C., https://doi.org/10.2499/9780896291867.

13. Shiva, V. and Bedi, G. (2002), *Sustainable agriculture and food security:*

the impact of globalization. Sage Publications India Pvt Ltd., New Delhi, India.

14. Tscharntke, T., Clough, Y., Wanger, Th. C., Jackson, L., Motzke, I., Perfecto, I., Vandermeer, J. and Whitbread, A. (2012), Global food security, biodiversity conservation and the future of agricultural intensification. *Biological Conservation*, vol. 151, is. 1, pp. 53–59. https://doi.org/10.1016/j.biocon.2012.01.068.

15. Beddington, J. (2010), Food security: contributions from science to a new and greener revolution. *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 365, is. 1537, pp. 61–71. https://doi.org/10.1098/rstb.2009.0201.

16. Pinstrup-Andersen, P. and Pandya-Lorch, R. (1998), Food security and sustainable use of natural resources: a 2020 vision. *Ecological economics*, vol. 26, is. 1, pp. 1–10. https://doi.org/10.1016/S0921-8009(97)00067-0.

17. Bezus, R. (2014), *Orhanizatsiino-ekonomichni zasady efektyvnoho rozvytku orhanichnoho ahrovyrobnytstva: monohrafiia* [Organizational and economic principles of effective development of organic agricultural production], Lizunov Press, Dnipro, Ukraine.

18. Gavaza, E. (2014), Organic market and its infrastructure: current state and prospects for development. *Ekonomika APK*, vol. 5, pp. 131–135.

19. Proshchalykina, A., Kyryliuk, Ye. and Kyryliuk, I. (2019), Prerequisites for the development and prospects of organic agricultural products market. *Entrepreneurship and sustainability issue*, vol. 6, no. 3, pp. 1107–1117. https://doi.org/10.9770/jesi.2019.6.3(18).

20. Kyryliuk, I. and Kyryliuk, Ye. (2017), Efficiency of the functioning of the state control system for the safety and quality of animal products in Ukraine. *Food Science and Technology*, vol. 11, no. 4, pp. 44–54. https://doi.org/10.15673/fst.v11i4.730.

21. Kyryliuk, I. and Kyryliuk, Ye. (2018), European and Ukrainian technical regulation systems in the area of animal product quality and safety: socio-economic aspects. *Financial and credit activity: problems of theory and practice*, vol. 2, no. 25, pp. 455–464. https://doi.org/10.18371/fcaptp.v2i25.136527.

22. Kyryliuk, I., Kyryliuk, Ye., Proshchalykina, A. and Sardak, S. (2020), Socio-economic factors of providing quality of livestock products in Ukraine. *Journal of Hygienic Engineering and Design*, vol. 31, pp. 37–47.

23. Kyryliuk, I. and Kyryliuk, Ye. (2020), *Orhanizatsiino-ekonomichni rishennia ta modeli pidvyshchennia yakosti produktsii tvarynnytstva v Ukraini: monohrafiia* [Organizational and economic solutions and models for improving the quality of livestock products in Ukraine], ChNU im. B. Khmelnytskoho, Cherkasy, Ukraine.

24. The official site of State Statistics Service of Ukraine (2018), Methodological provisions for the preparation of standard reports on the quality of state sample surveys of the population (households), available at: www.ukrstat.gov.ua/metod_polog/metod_doc/2018/291/mp_sz_yar.pdf.

25. The World of Organic Agriculture Statistics and Emerging Trends 2020

(2021), available at: http://www.organic-world.net/yearbook/yearbook-2020.html.

26. The official site of State Statistics Service of Ukraine (2020), Balances and consumption of the main food products by the population of Ukraine, available at: www.ukrstat.gov.ua/druk/publicat/kat_u/publ7_u.htm.

27. The official site of State Statistics Service of Ukraine (2020), Expenditure and resources of households of Ukraine, available at: ww.ukrstat.gov.ua/operativ/menu/menu_u/virdg.htm.

28. The official site of State Statistics Service of Ukraine (2020), The Statistical Yearbook Agriculture of Ukraine, available at: www.ukrstat.gov.ua/druk/publicat/kat_u/publ7_u.htm.

29. Agricultural policy. Agropolite (2019), Analysis of the organic market in Ukraine, available at: https://agropolit.com/spetsproekty/407-analiz-rinku-organichnoyi-produktsiyi-v-ukrayini.

30. FiBL. The World of Organic Agriculture Statistics and Emerging Trends 2020 (2021), available at: https://www.fibl.org/fileadmin/documents/shop/5011-organic-world-2020.pdf.

31. Official site of Organic Standard (2019), available at: http://www.organicstandard.com.ua/ua/clients.

32. IFOAM (2019), The World of Organic Agriculture: Statistics and Emerging Trends 2018, available at: https://shop.fibl.org/CHen/mwdownloads/download/link/id/1093/?ref=1.

33. Landlord (2019), Ukrainians feed back on organic consumption, available at: http://landlord.ua/ukrayintsi-pasut-zadnih-za-spozhivannyam-organichnoyi-produktsiyi.

34. Vysotska, I. (2014), New approaches to definitions quality and safety of animal products. *Visnyk SNAU. Seriia «Ekonomika i menedzhment»,* vol. 4(59), pp. 82–88.

35. Gavaza, E. V. (2014), Formation and development of the market of organic products, Ph.D Thesis, Kyiv, Ukraine.

36. Official site of the Ministry of Economy of Ukraine (section "Organic production in Ukraine") (2021), available at: https://agro.me.gov.ua/ua/napryamki/organichne-virobnictvo/organichne-virobnictvo-v-ukrayini.

37. Organic Info (2021), available at: https://organicinfo.ua/stores.

38. Yufeng, L. and Chengyan, Yu. (2020), Consumer willingness to pay for organic and animal welfare product attributes: do experimental results align with market data? 2020 Annual Meeting, July 26–28, Kansas City, Missouri 304328, Agricultural and Applied Economics Association. https://doi.org/10.22004/ag.econ.304328.

39. Krystallis, A. and Chryssohoidis, G. (2005), Consumers' willingness to pay for organic food: factors that affect it and variation per organic product type. *British Food Journal*, vol. 107, no. 5, pp. 320–343. https://doi.org/10.1108/00070700510596901.

40. Bunte, F. H. J., van Galen, M. A., Kuiper, W. E. et al. (2010), Limits to Growth in Organic Sales. *De Economist*, vol. 158, pp. 387–410. https://doi.org/10.1007/s10645-010-9152-3.

41. National survey «Attitudes of consumers of Ukraine and the EU to organic products» (2021), available at: https://organicinfo.ua/news/eu-ukraine-consumer-awareness-organic2020.

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