

FORECAST SCENARIOS OF DEVELOPMENT OF THE INTERNAL CONSUMER MARKET OF ORGANIC PRODUCTS IN UKRAINE

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Abstract

The article is devoted to substantiation of the forecast scenarios of development of the internal consumer organic products market in Ukraine. The essence of organic agriculture as a complete system and management of agro-ecosystems, including the assessment of environmental threats and risks of environmental safety in the agricultural sector, and establishes the relationship between economic actors in the agricultural organic production. The current state and trends of the main indicators of organic agriculture development in Ukraine are analyzed. Taking into account probable economic changes and possible variants of the transformation of market conditions, we have grounded three basic adaptation scenarios for the development of domestic organic agriculture for the future: inertial, moderate and innovative. The prognostic model of indices of the internal consumer market of organic produce is suggested, which provides for their modeling based on multiple regression. The study of trends and the calculation of predictive values of independent variables of the model for the near future are based on the extrapolation method. Based on the model data of organic farming, a forecast of the internal consumer market in this area for the period up to 2022 has been made. The use of the proposed model will enable the formation of credible prospect balances of demand and supply on the organic market, depending on the factors of influence and scenarios of its development.

Key words: forecast scenarios, market, organic products, agricultural.

INTRODUCTION

At the present stage of development of the agrarian sector of the economy, the degree of food and environmental security is significantly conditioned by alternative technologies in the field of agriculture and the preservation of the natural resources of the agrosphere. Today among these systems the most developed is in organic agriculture, practiced at the commercial level in many countries of the world [8]. Organic agriculture is a vibrant and dynamic system that responds to internal and external needs and conditions. Those who use organic farming methods can improve efficiency and increase productivity, but at the same time human health and well-being should not be at risk. However, despite

the use of certain measures by the state and business entities, organic agriculture and the organic foods market are still not sufficiently developed.

With the growing role of organic farming and the expansion of its use as a tool for environmental management, attention to the scientific issues of this phenomenon has increased. Under current conditions, when organic agriculture and organic market in general are regarded as factors of sustainable development is a very important issue for strategic planning of the market of organic foods.

Today, fundamental research on the problems of the development of organic agriculture is widely researched in economic science. Among the recognized scientists who have

made a significant contribution to the study of these problems, it should be noted M. Fukuoka, A. Howard, M. Okada, J. Rodale, R. Steiner, B. Williams. Problems of the formation of the domestic market of organic foods were considered in works of S. Antonets, V. Artish, N. Borodacheva, T. Zaychuk, E. Milovanov and others. Ecological and economic foundations of the development of organic production in agricultural were covered in his works by V. Chudovska, T. Zinchuk, O. Khodakivska, V. Kyporenko.

However, the problems of organic agriculture are need to the further research to improve the mechanisms for its development in terms of adaptation to the corresponding ecological and economic conditions and institutional environment. Particular attention should be paid to the problem of forecasting the development of organic production of organic produce market in general.

MATERIALS AND METHODS

One of the main tasks, amongst which we put forward, was to identify the forecast scenarios for the development of the internal consumer organic produce market, which was achieved through the calculation of their forecast indicators.

To predict the values of the indices of development of the market of organic products, a model of multiple regression is constructed and its adequacy is estimated according to Fisher's criterion. The study of trends and the calculation of predictive values of independent variables of the model for the near future are based on the "extrapolation method, namely, the Holt's exponential smoothing" [4]. The method is based on the estimation of the degree of linear growth (or falling) of the indicator in time. The coefficient of change of the indicator is estimated by the coefficient, which in turn is calculated "as the exponentially weighted average of the differences between the current exponentially weighted average values of the process and their preliminary values" [4]. Using the software *EViews 10*, dynamics indicators were investigated based on official

statistical data of 2005-2017.

The information base for the study consists of documents, databases on organic farming, materials and reports of the State Statistics Service of Ukraine, the Ministry of Agrarian Policy and Food of Ukraine, the standards of the International Federation for the Movement for Organic Agriculture (IFOAM), EU regulations, as well as methodological recommendations of scientific institutions, materials of own research, other literary sources on research issues.

RESULTS AND DISCUSSIONS

As an independent direction, organic agriculture was founded in the USA and Europe since the 1940s, as opposed to dependence on synthetic fertilizers and plant protection products. J.I. Rodale, founder of Organic Farming and Gardening Magazine, was one of the first to popularize the term itself, emphasizing that organic products are the most beneficial to health [10; 11].

Given the diversity of the definition of the term "organic agriculture" [1; 3; 12; 16], it must be noted that they all reach agreement on the fact that this is a system based on production management. However, agriculture is not only a production system, but also a way of life of the rural population in certain environmental conditions, is an agrosystem. It is a system that takes into account the potential adverse effects on the environment and humans of such synthetic additives as mineral fertilizers and pesticides, genetically modified organisms, and the like. All these methods are subject to change in organic agriculture by special methods that preserve and increase soil fertility, prevent the multiplication of pests and the growth of diseases. Organic agriculture makes it possible in the future to coordinate and harmonize environmental, economic and social goals in the agricultural sector of the economy. In particular, the advantages of the production of organic agricultural products include: minimizing the negative impact on the environment; independence from mineral fertilizers and pesticides and their producers, and as a consequence, a decrease in the

energy intensity of the national economy; the creation of additional jobs in rural areas, prospects for farms; production of healthy, organic and environmentally friendly food.

So organic farming is a system that relies on the management of agro-ecosystems, and not just agricultural production. That is, in addition to production management, the system of organic agriculture also includes the implementation of a set of measures that directly provide this production in order to achieve economic, environmental and social effect. Thus, organic agriculture can in its essence be defined as an integrated system of agro-ecosystem management, including an assessment of environmental threats and risks of environmental safety in the agricultural sector and establishes the procedure for the relationship of economic actors in the process of organic farming.

In recent years, having considerable potential of organic sector, in particular organic production and domestic consumption, Ukraine has achieved some results in developing this field of agrarian economy (Table 1).

According to the Ministry of Agrarian Policy and Food of Ukraine, as of the beginning of 2018, Ukraine ranks 11th among the countries of Europe and the 20th in the world for the total area of agricultural lands certified as organic. Over the past 5 years, they have increased by 54% and today make up 420 thousand hectares. Most among the organic products we grow grain, however is gaining popularity growing position crops such as berries. It is expected that the organic production in Ukraine will increase further, as European capacities are not able to meet local demand for it.

Table 1. Main indicators of organic agriculture development in Ukraine

Indicator	Year								
	2005	2010	2011	2012	2013	2014	2015	2016	2017
Area of organic agricultural land, thousand hectares	242.0	270.2	270.3	272.9	393.4	400.8	410.5	412.2	420.0
Share of organic lands in the general structure of agricultural lands, %	0.58	0.65	0.65	0.66	0.95	0.97	0.99	0.99	1.01
Number of certified organic agricultural enterprise	72	142	155	164	175	182	210	360	375
Share of organic producers, %	0.12	0.25	0.27	0.29	0.31	0.32	0.37	0.64	0.66
The internal consumer market for organic products, EUR million	0.2	2.4	5.1	7.9	12.2	14.5	17.5	21.2	29.4
Export of organic products, EUR million	–	–	–	1.2	16.5	18.0	21.2	40.1	99.0

Source: Calculated by the author based on the data of Ministry of Agrarian Policy and Food of Ukraine.

Exports have grown more than 20 times over the past ten years and reached 99 million euros in 2017. The main export products are cereals, oilseeds, legumes, berries, fruits and wild boars. The domestic organic foods market also has a tendency for rapid growth, in particular, in 2017 the consumer market for organic produce in Ukraine amounted to 29.4 million euros, and consumption per capita – 0.68 euros. For comparison, an average European spends on organic products 40.8

euros a year, and a citizen of the EU – 60.5 euros [18]. Currently, the internal consumer organic market in Ukraine is gradually expanding, especially through the network of supermarkets, which actively create and develop the attractiveness of organic agricultural products. The main types of foods on the internal organic market of Ukraine include veggies, fruits, greengrocery, grains, meat, dairy products, cereals and baked goods.

The high level of competitiveness of organic products in international and domestic markets and ensuring the innovative development of the agrarian sector is due to the improvement of the integrated marketing mechanism for the promotion of organic products, which enables to reduce the negative impact of external factors that restrain the growth of the regional economy. Taking into account the probable technological transformations on the world consumer market (which are related to the acceleration of the start of a new

technological cycle or its delay caused by the large-scale replication of innovations) and the market situation, we proposed three basic alternative scenarios for the development of the organic foods market: inertial – conservation modern trends in conditions of moderate development, raw material orientation of organic farming and its dependence on external markets), moderate – gradual stimulation of innovation potential development and innovation – active development of the industry at the post-industrial stage (Table 2).

Table 2. Adaptive scenarios for the development of organic sector and market

The sphere of transformation	Development scenarios	Directions of development
Expansion of demand for organic products	Inertial	Redistribution of efforts to promote products in favor of business associations and contact audiences, differentiation of incentive tools
	Moderate	Commodity advocacy and promotion of products from organic products, its useful and nutritional properties
	Innovative	Creation and implementation of tools to stimulate demand for organic products and support its proposals; stimulating the use of minimum sizes of trade mark-ups for socially significant types of goods
Development of the organic sector	Inertial	Emphasis on situational solutions and soft reforms. Adaptation of ready-made organizational forms of management, infrastructural elements and technologies
	Moderate	Active involvement of non-budgetary funds in organic agriculture (public-private partnership), large-scale localization of production and sales entities
	Innovative	Improvement of the wholesale realization system on the basis of the formation of trade and production associations, expansion of the sphere of activity of marketing cooperatives of various levels, development of consumer cooperation, organization of the work of the exchanges, including electronic, clusterization of the regional production and marketing system of functioning of the organic sector
Formation of equal economic relations	Inertial	Conservation of basic institutions. Soft law reform within the framework of traditional law
	Moderate	Targeted support of business climate, support of integration and cooperation of market interaction subjects; improvement of antimonopoly and tax policy, intensification of the professional level of participants in the organic market
	Innovative	Principal improvement of institutional conditions: provision of effective antimonopoly policy, support for competition (overcoming of corrupt mechanisms of functioning of agribusiness, reduction of administrative barriers); increase the volume of preferences and tax breaks in order to introduce innovations and ensure sustainable economic growth
Creation of a single economic space	Inertial	Manual management of the economy, including innovative processes, point-based solutions to improve the marketing and innovation of the business climate.
	Moderate	Gradual development of the general economic environment in the organic sphere, infrastructure of marketing and innovation activity
	Innovative	The introduction of differentiated tariffs for transportation of products, merging into a single management process of production and marketing with the aim of identifying at the zero stage of the life cycle, flexible pricing, carrying out research work on the development of market novelty products, indicative planning and forecasting of demand, attracting investment and financial resources, organization of effective promotion and distribution
Information provision of participants in the organic market	Inertial	Gradual creation of information databases of organic producers and products that they produce in response to emerging inquiries
	Moderate	Organization of the system of information support available to market participants, which reveals information about prices, sales volumes, commodity stocks in this market, forecast indicators of its functioning
	Innovative	Development of a holistic marketing information system for the selection of communication tools (PR, advertising, etc.) facilitating the exchange of information about products, their qualitative characteristics, business reputation and entrepreneurial activity of enterprises with real and potential consumers in order to increase the prestige of trademarks.

Source: formed by the author for [2; 5; 6; 15; 13; 19].

Implementation of the scenario of innovation development involves organizing measures to improve the mechanisms of economic relations in the organic sector, which includes the involvement of state incentives along with marketing mechanisms. Note, that the effectiveness of state support in the organic products market directly depends on the existing mechanisms of state support and their ability to compete with the market.

At the same time, in practice, the likelihood of a successful implementation of any clean scenario is very low due to the high level of investment costs of innovation development. State support in this case is limited to a predefined list of measures and is placed on the axis of coordinates depending on the amount of funding, the effectiveness of institutional transformations, etc.

Despite the obvious difficulties at the stage of realization of innovation scenarios of innovation development, they remain the most promising for implementation due to rising risks, and as a consequence of losses from delays in their implementation in geometric progression. Taking into account institutional conditions such as: mitigating administrative barriers, expanding preferential taxation, restricting the activities of agricultural producers, which do not provide financing for innovation development and modernization of production, it is necessary to accumulate expenditures to meet the innovative needs of farms and ensure the inflow of investments into innovation activities [9].

The introduction of the innovation development scenario allows state authorities to introduce a regulatory mechanism, which to a certain extent can also be used to implement scenarios aimed at developing competition in the organic market, regulating the level of formal and informal preferences, breaking economic barriers and improving the competitive mechanism for public procurement. That is, this approach cannot be called ideal, however, it can act as a basis for the implementation of flexible government programs aimed at adjusting the assortment quality, price, distribution blocks of the marketing strategy of organic enterprises in the market in the course of monitoring their

implementation.

In general, the implementation of the strategy for the development of the market for organic farming will transform the process of production management into a continuously updated strategic activity aimed at developing and making new management decisions based on the results of current marketing research and innovation imperatives.

An important element of strategic planning for organic market development is forecasting the volume of demand in this market, in particular, the internal consumer market [7; 17]. As already mentioned, in recent years, there has been a trend to growth the volume of organic production in Ukraine. The forecast of development of the internal market for organic foods should be developed on the basis of certain scenarios with different rates of growth of volumes of production, directions of development, areas of land resources, structure and placement of production.

In order to plan the future development of the internal consumer organic products market, a model of multiple regression is proposed and an evaluation of its adequacy according to Fischer's criterion is proposed. Multiple regression model in general can be represented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m + \varepsilon, \quad (1)$$

where Y – dependent (resulting) variable;

$X = X(X_1, X_2, \dots, X_m)$ – independent vector (factor) variables;

β – vector of parameters (to be determined);

ε – random error (deviation);

β_0 – is a free member that defines the value of Y in the case when all the explanatory variables X_j are equal to 0.

In order to form multiple regressions, we introduce the following symbols of variables: denote the dependent variable of the internal consumer market for organic products through *ICMOP*; Independent variables: *AOFL* – the area of organic agricultural land; *QOF* – number of organic farms; *EOP* – organic products export.

Given the designations made by us multiple regression model of dependence of the market will impact on factors like:

$$ICMOP = \beta_0 + \beta_1 * AOFL + \beta_2 * QOF + \beta_3 * EOP + \varepsilon, \quad (2)$$

The result of the multiplier correlation coefficient $R = 0.986$ indicated a strong correlation between the resulting index and factor characteristics. The determination coefficient R^2 is then 0.972. Since the actual value of $F > F_{kp}$, the determination coefficient is statistically significant and the regression equation is statistically reliable.

In general, as a result of the calculations with the software *EViews 10* was received an equation of multiple regression:

$$ICMOP = -12.5835 + 0.05042 * AOFL + 0.02502 * QOF + 0.1131 * EOP, \quad (3)$$

Possible economic interpretation of the parameters of the model: increasing in the area of organic agricultural land by 1 thousand hectares will increase the volume of domestic consumption of organic products by 50.42 thousand euros; increasing in the number of organic farms even on 1 farm will also increase this figure by 25.02 thousand euros; increasing in exports of organic products – will lead to an increase in the volume of consumption of organic produce – 113.1 thousand euros. The statistical significance of the equation is verified using the determination coefficient and Fisher's criterion. It has been established that in the studied situation, 97.2% of the overall *DCMOP* variability is explained by the change in the factors introduced into the model.

On the basis of model data, the forecast of the domestic consumer organic products market for the period up to 2022, depending on the scenarios of the development of organic agriculture in Ukraine (Table 3).

According to the scenario of inertial development, which depends on the current trends in the organic farming, moderate growth of exports will occur as a result of

increased demand for internal organic products in foreign markets and the conclusion of forward contracts for future harvests. At the same time, with the growth of domestic demand, there will be a tendency to increase import operations, which will cover the deficit of domestic products. In general, according to the inertial development scenario, the volume of domestic consumption of organic produce will increase to 20.822 to 38.8 million euros.

Table 3. Forecast of indices of the internal consumer organic market for the period up to 2022, depending on the factors, EUR million

Year	Scenario development		
	Inertial	Moderate	Innovative
2018	25.7	34.9	43.9
2019	28.9	39.2	52.3
2020	32.2	41.9	60.5
2021	35.5	46.4	73.9
2022	38.8	49.6	81.7

Source: author's calculations.

The scenario of moderate development includes taking into account the policy of import substitution in the organic sector, as well as the use of organizational and economic instruments for the development of the sector of production and processing of organic products, which will enable the internal consumer market to increase to 49.6 million euro by 2022. With an optimistic scenario of innovation development, due to increased demand from domestic processors, the indicator of the domestic consumer organic market will reach 81.7 million euro by 2022.

The considered strategic scenarios for the development of organic sector should be adopted as target principles for the development of the state program for the development of organic agriculture, as well as regional and local programs for the development of this industry [14]. This will allow to implement the planned measures to ensure the balance of their target and targeted directions, supported by the necessary resources. To fulfill the set tasks, a consistent state policy is needed, as well as the formation of a system of practical actions at each enterprise to improve the production process

using a set of organizational, economic and social measures of economic incentives.

In the long term, the introduction of the scenario of innovative development will enhance the efficiency, balance and competitiveness of the organic farming.

CONCLUSIONS

Thus, taking into account the level of influence of the identified factors, medium-term scenarios of the development of organic agriculture in Ukraine have been formed, which provide an opportunity to predict the development of this sector of the economy depending on the economic situation. The formation of one or another scenario of organic agriculture development depends both on the trends of the world economy development and on the internal course of the state economic policy. The functioning of this sector depends primarily on the trends that will be observed in the agricultural sector as a whole, since traditional and organic technologies of agrarian production are interdependent and complementary production lines. As the analysis of key factors has shown, creation of favorable conditions for conducting agribusiness is a priority measure for the development of the internal consumer market of organic agriculture produce.

In order to plan the future development of the agricultural organic sector, it is possible to apply the developed model, which involves modeling their indicators on the basis of multiple regression.

The use of the proposed model will enable the formation of credible prospect balances of demand and supply on the market of organic foods, depending on the factors of influence and scenarios of its development.

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